A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

October 31, 2005

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Acronyms and Abbreviations

ANJEC	Association of New Jersey Environmental Commissions
BAQP	Bureau of Air Quality Planning
DAQ	Division of Air Quality Planning
DCE	Division of Compliance and Enforcement
LP	Liquid Propane
MANE-VU	Mid-Atlantic/ Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association
NJBPU	New Jersey Board of Public Utilities
NJDCA	New Jersey Department of Community Affairs
NJDEP	New Jersey Department of Environmental Protection
NJDOA	New Jersey Department of Agriculture
NO_x	Nitrogen Oxides
O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards
PM_{10}	Particulate Matter (matter less than 10 microns)
$PM_{2.5}$	Fine Particulate Matter (matter less than 2.5 microns)
PSE&G	Public Service Enterprise Group
SCC	Source Classification Code
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
tpy	Tons per year
VOC	Volatile Organic Compounds

Executive Summary

There is no one air pollution control strategy that, if instituted alone, will improve the quality of the air in New Jersey to reach healthful levels in New Jersey. As a result of an air quality initiative by the New Jersey Department of Environmental Protection (NJDEP), the Homes and Restaurants Workgroup was formed to address specific sources of air emissions that comprise of a significant portion of the emissions inventory and, as such, are thought to have a significant negative impact on the air quality in New Jersey. Representation in the workgroup included public citizens, environmental groups, industry, commercial businesses, members of the scientific community, and local, state, and federal government.

After a series of deliberations throughout the summer months in 2005, the workgroup has developed a prioritized list of strategies for air emission sources in the homes and restaurants categories that will be reviewed by New Jersey for further consideration and possible implementation. The workgroup discussions could be thought of as "brainstorming" sessions whereby any ideas raised by the workgroup participants were considered. A comprehensive list of these ideas is included in Appendix 3. Table 1 (page 12) is a summary of the most promising strategies, which only includes the ideas that the workgroup decided should be further investigated.

The workgroup believes these strategies to be the most promising based on analyses of a series of factors, including but not limited to environmental, technical, economical, and social impacts, enforceability, and implementation feasibility. General consensus was reached on most of the strategies. The varying views on the recommendations for further consideration are presented as pros and cons in the tables in Appendix 3.

The workgroup was of general consensus that wood burning sources must be addressed. First, New Jersey should investigate adopting lower emission standards for wood burning stoves and fireplace inserts and then conduct a region-wide wood stove change-out program. Financial incentives for homeowners, as well as possible mandatory change-out of these units at time of home sale or mandatory use of natural gas in certain fireplaces, should be investigated. The State should continue to prompt the USEPA to develop standards for outdoor wood boilers and to reexamine the current standards for wood stoves and fireplace inserts. In particular, New Jersey should pursue legislation to require all outdoor wood burning to be conducted at a certain minimum distance from a property line and to provide local and county governments the authority to adequately respond to citizen complaints and enforce New Jersey's Air Pollution Control Act for outdoor wood burning. Secondly, New Jersey should consider changes to its current open burning regulations (N.J.A.C. 7:27-2 et seq.) to further limit the types, quantities, and timing of what can be burned by permit in the State.

It is also recommended that the State consider phasing-in the lowering of the sulfur content of all fuel oils sold in the State at some future date(s). This should be implemented regionally for the greatest benefit to air quality in New Jersey.

Current programs through the New Jersey Board of Public Utilities (NJBPU) address the issue of home energy efficiency, renewable energy, and energy conservation. While the current program is the one of the best, if not the best, in the nation, the workgroup thinks that the program can be expanded to include more communication, funding, or avenues of implementation to commercial or industrial applications. The Energy Star program could also be expanded to cover different types of appliances commonly used in New Jersey that do not have Energy Star ratings.

New Jersey should consider investigating current regulations for certain types of restaurant operations such as those adopted by California. The types of processes covered by potential regulation or requiring scheduled and proper maintenance of existing equipment should be investigated before preparation of a regulatory proposal.

Finally, overarching every recommendation in this report is the need to develop effective and far-reaching communications with the general public on the need to reduce air pollution from these sources. The workgroup believes that only through effective communications will the general public accept and modify their actions to produce less pollution from their home environments. Communication is the key tool for creating an atmosphere where the common citizen will readily accept the purpose of a wood stove change-out program, the incremental cost of buying lower sulfur fuel, and the initial capital expense of installing energy efficiency measures. The workgroup could not stress strongly enough the need for clear and effective communications on the benefits that the implementation of any or all of these strategies will have on New Jersey's air quality.

The next step for the Homes and Restaurants Workgroup is to present a summary of the selected recommendations for further consideration to the NJDEP Management on November 14, 2005.

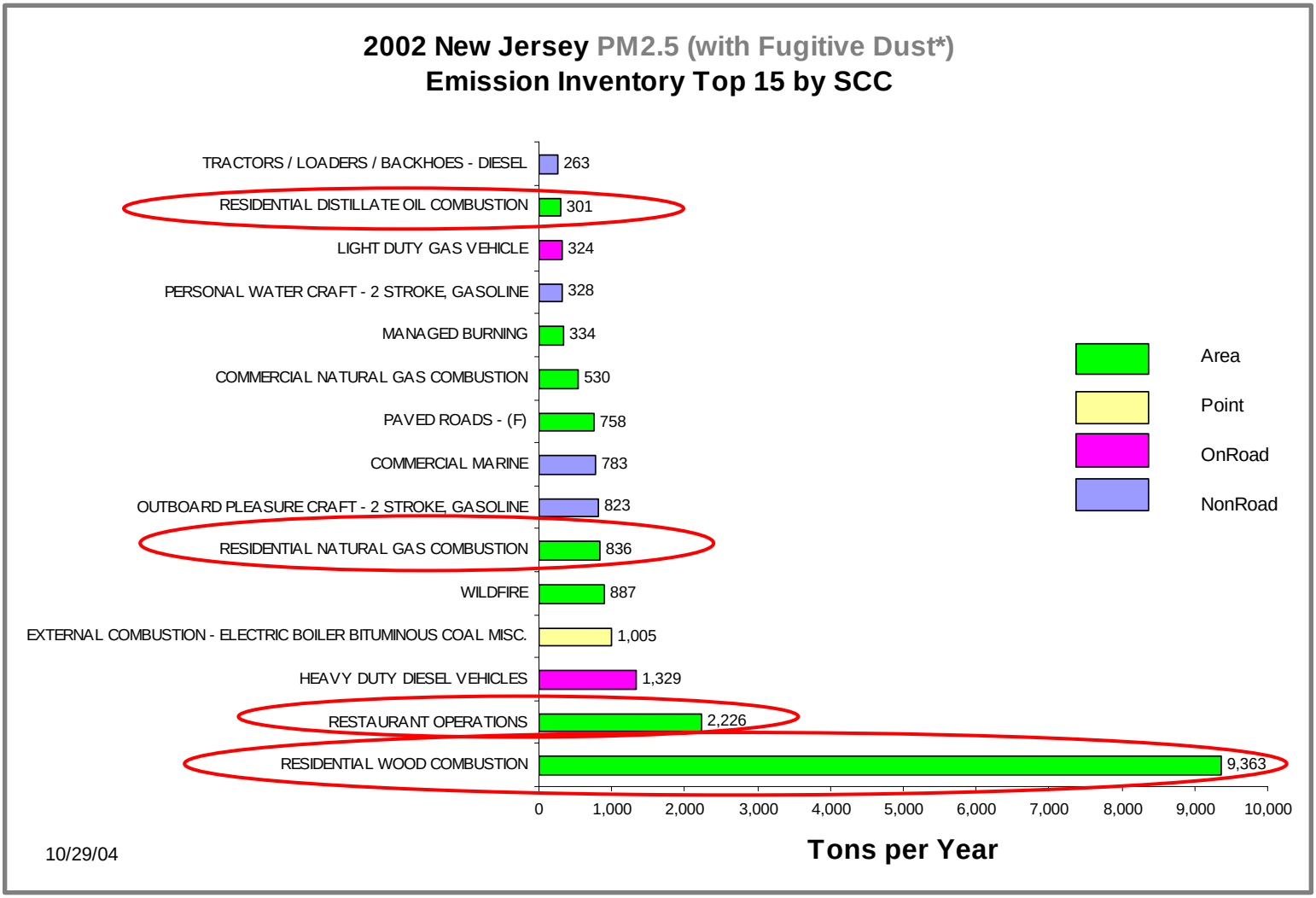
The Homes and Restaurants Workgroup Report
October 31, 2005

I. Introduction

In order to reduce air pollution in New Jersey, it is important for the public, representatives from local businesses, industry and environmental groups, and others to work together on strategies to achieve this goal [1]. The Homes and Restaurants workgroup represents one of the workgroups involved in the effort by the New Jersey Department of Environmental Protection (NJDEP) to bring together representation from these various groups. The NJDEP initiated this collaborative effort by hosting a public workshop on Wednesday, June 29, 2005 at the Trenton War Memorial. At the workshop, six workgroups were formed to focus on significant sources of air emissions resulting in nonattainment of federal air quality standards and to recommend control strategies for further consideration to reduce these emissions. The Homes and Restaurants Workgroup was formed for the following reasons:

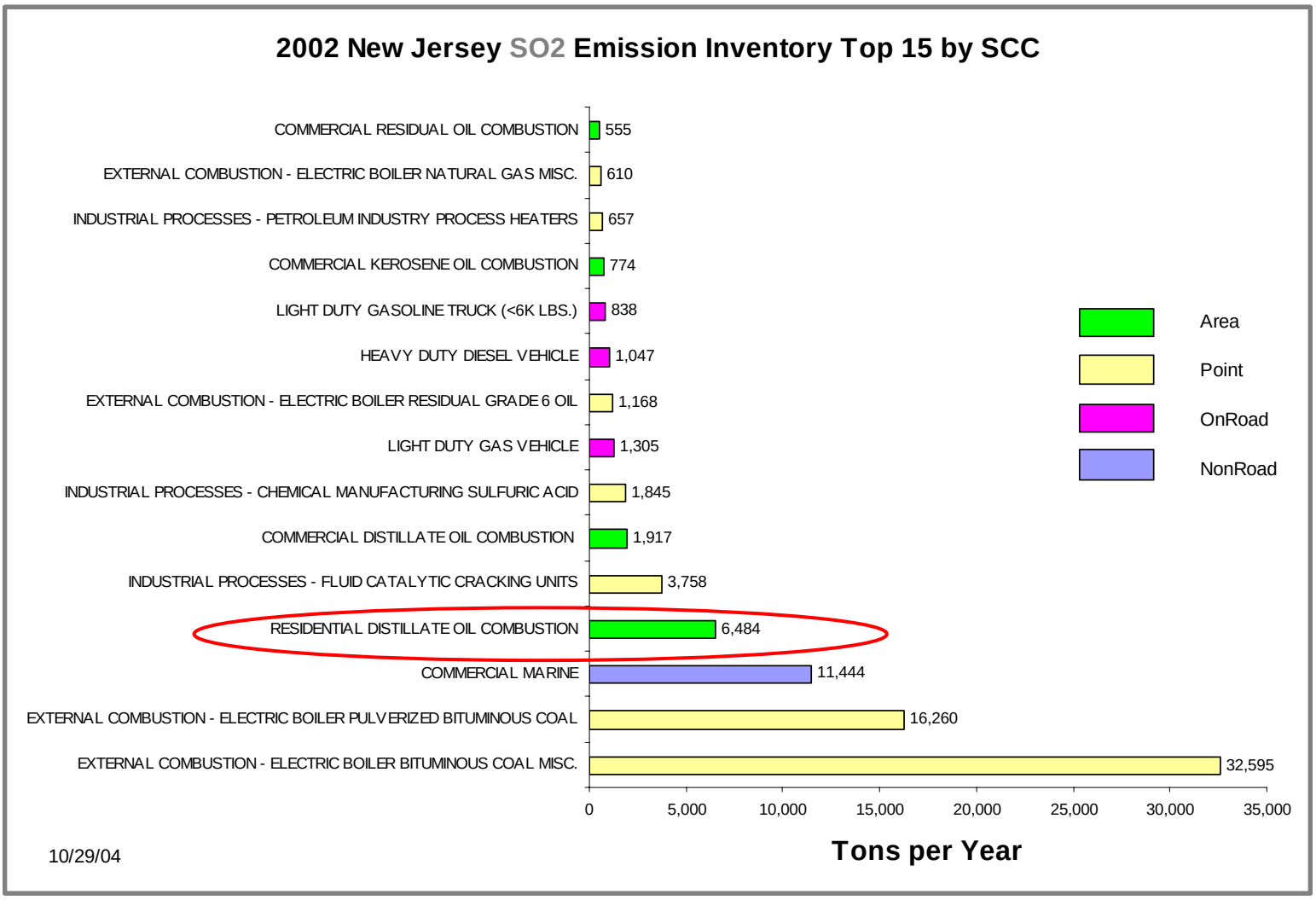
1. Sources categorized in this workgroup fall in the top 15 air emission sources in New Jersey's 2002 draft air emission inventory for $PM_{2.5}$ and SO_2 [2]. See Figures 1-2.
2. Relatively few controls exist for the sources targeted in this workgroup.
3. Input from the citizens and groups that are affected by potential controls is essential for successful and effective regulatory or non-regulatory framework that will result in air emission reductions.
4. Specifically, residential wood combustion has been identified as a $PM_{2.5}$ regional problem in the northeast US [3]. See Figures 3-5.
5. The applicable sources contribute significantly to pollutants that are precursors to ozone and fine-particle pollution. The health effects from ozone range from increased susceptibility to respiratory infections to death [4]. Similarly, the health effects from fine particulate matter range from school and work absences to premature death [5].
6. Emission reductions from these sources will help New Jersey attain the health-based standards for $PM_{2.5}$ and 8-hour ozone and reach the visibility goal for regional haze.

Figure 1. Applicable High-Emitting Source Categories in the Homes and Restaurants Workgroup – Comparing Point, Area, and Mobile Sources for $PM_{2.5}$ Emissions



The applicable source categories from Figure 1 to the Homes and Restaurants Workgroup are Residential Wood Combustion (9,363 tpy), Restaurant Operations (2,226 tpy), Residential Natural Gas Combustion (836 tpy), and Residential Distillate Oil Combustion (301 tpy).

Figure 2. Applicable High-Emitting Source Categories in the Homes and Restaurants Workgroup – Comparing Point, Area, and Mobile Sources for SO_2 Emissions



The applicable source categories from Figure 2 to the Homes and Restaurants Workgroup is Residential Distillate Oil Combustion (6,484 tpy).

Figure 3. Figure 6 from MARAMA's Report on Residential Wood Combustion in the Northeast US for Indoor Wood Burning Equipment for the Region in 2002

Figure 6. 2002 PM2.5 Emission Density Map for Indoor Equipment (MANE-VU Region)

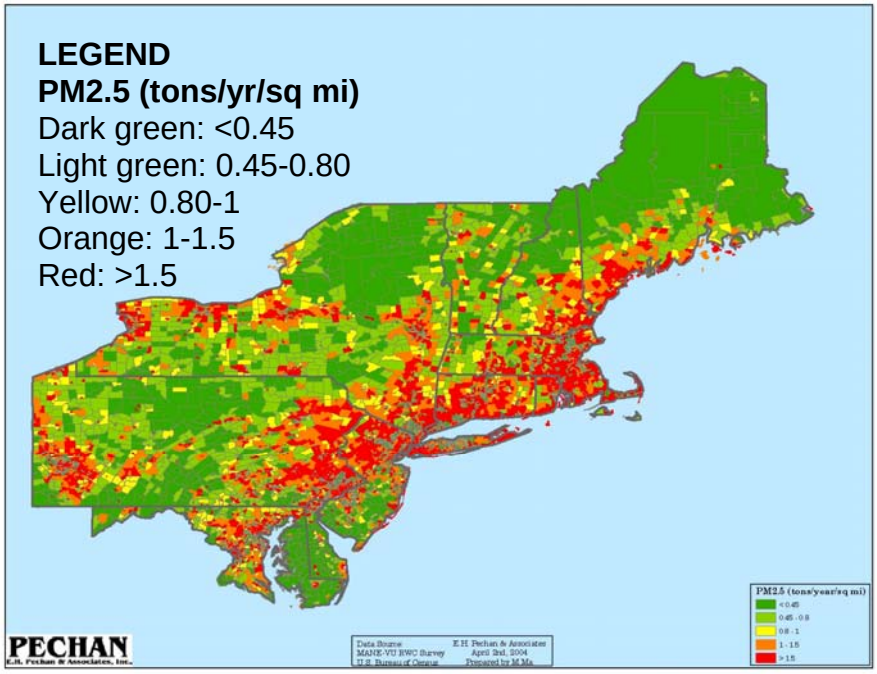


Figure 4. Figure 4 from MARAMA's Report on Residential Wood Combustion in the Northeast US for Indoor Wood Burning Equipment in Pennsylvania and New Jersey in 2002

Figure 4. 2002 PM2.5 Emissions Density Map for Indoor Equipment (PA, NJ)

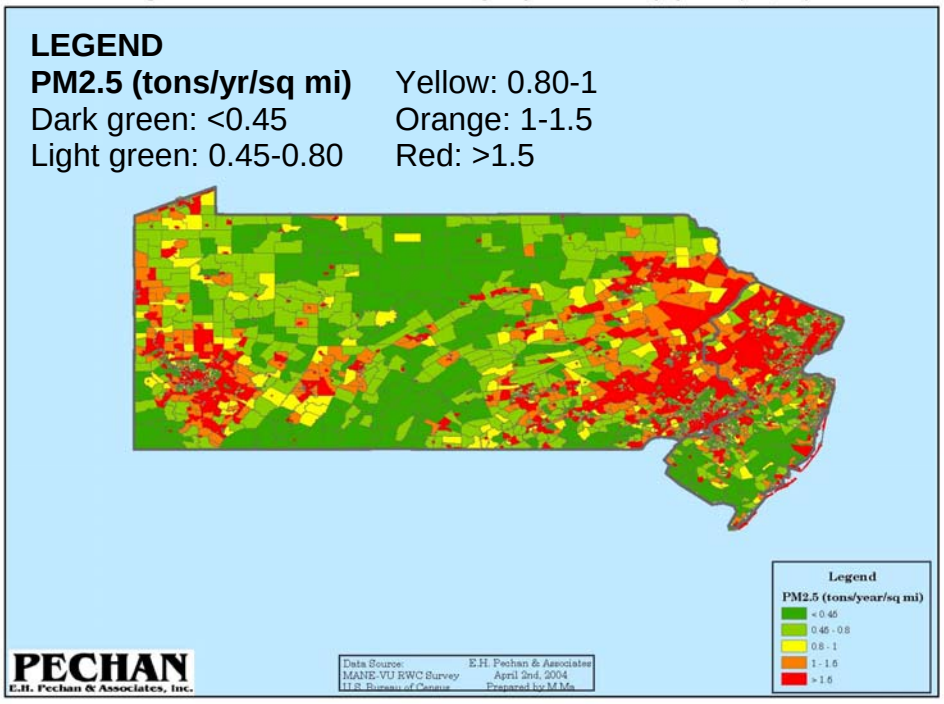
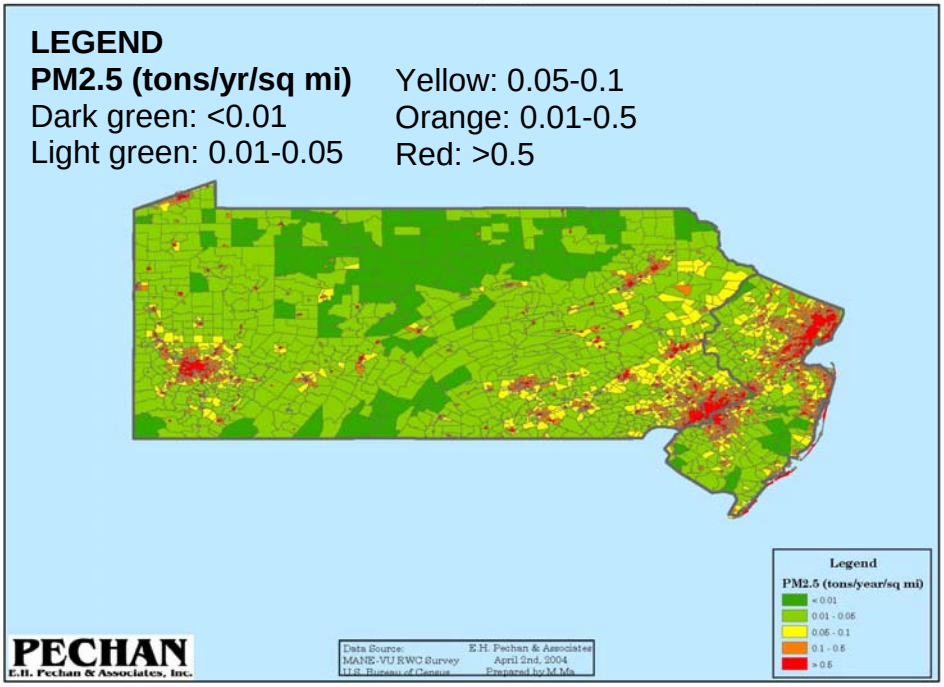


Figure 5. Figure 10 from MARAMA's Report on Residential Wood Combustion in the Northeast US for Outdoor Wood Burning Equipment in Pennsylvania and New Jersey in 2002

Figure 10. 2002 PM2.5 Emissions Density Map for Outdoor Equipment (PA, NJ)



Some of the health consequences associated with exposure to elevated levels of ozone in New Jersey in 2002 were 742,000 cases of respiratory symptoms, 44,000 cases of asthma attacks, and 920 cases of hospital admissions [4]. Every year in New Jersey, exposure to fine particulate pollution above the current annual standard results in more than 1,000 premature deaths and up to 68,000 asthma attacks [5]. Reducing emissions from these sources will help achieve better air quality in New Jersey and thus potentially decrease the associated health effects from exposure to their pollutants.

Given the recent nationwide coverage of Hurricane Katrina and its effects on the supply and prices of oil, many people are looking toward alternatives for oil, especially for home heating. Several news articles have been published relaying that homeowners will be encouraged, or may decide on their own, to return to coal and wood to heat their homes. Therefore, the Homes and Restaurants Workgroup report represents more

than a group exercise but a clear message that the categories analyzed by the workgroup are environmentally and socially relevant, not only on the state level, but on the federal level.

II. Purpose and Goals

Each workgroup was tasked with identifying viable ways to reduce air contaminant emissions from their source categories, along with pros and cons of those options. Specifically, the overall goals for each workgroup were to:

- Identify strategies to achieve emission reductions
- Prioritize reasonable and effective control measures
- Identify implementation issues and potential solutions
- Identify additional sources of data to enhance the state's database of air pollutants [6]

The NJDEP was looking for ideas for control measures that would impact any of the four ozone and $PM_{2.5}$ precursors: volatile organic compounds (VOCs), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and fine-particle pollution (direct $PM_{2.5}$). As mentioned in the previous section, the sources in the Homes and Restaurants Workgroup significantly impact the emissions of direct $PM_{2.5}$ and SO_2. The specific charge of this workgroup was to recommend potential ways to control and/or reduce emissions from the varied sources of combustion used by homeowners and restaurants [6]. The workgroup discussions could be thought of as "brainstorming" sessions whereby any ideas raised by the workgroup participants were considered. Topics included indoor and outdoor wood burning, emissions from restaurant operations, renewable energy and energy efficiency, and home heating oil.

All members of the workgroup were encouraged to provide "white papers" on specific strategies to assist the NJDEP in its subsequent deliberations on measures to include in the State's plan to address federal air quality standards. No white papers were submitted from the Homes and Restaurants Workgroup members.

Each workgroup was expected to identify the most promising areas where further exploration of emission reduction opportunities could be focused for possible inclusion in the State's plan to address federal air quality standards even if the workgroup members could not come to a consensus on every reduction strategy.

The workgroup process is an early step in the development of the State plan for New Jersey. It is suggested that there be additional opportunities to select and refine measures for inclusion in the State's plan beyond this exercise. In addition, it is expected that many workgroup members from the Homes and Restaurants Workgroup will continue to be active in developing and commenting on both the proposed lists of ideas and the detailed implementation plan, including any rule proposals.

III. Structure of the Workgroup

The Homes and Restaurants Workgroup covered a multitude of air emission sources and the possibility of forming subgroups was proposed. The workgroup members decided to stay together as a plenary group to address all issues rather than split into different subgroups. The subsequent meetings would address related sources and members could choose the meetings to attend rather than attend every meeting (see Section IV). The last meeting, September 14 - Wrap-Up and Review, brought everyone together to finalize the workgroup's ideas and suggestions.

IV. Summary of Meetings/Conference Calls/Data Reviewed

The following meetings were held to address air emission sources in the Homes and Restaurant Workgroup:

1. June 29, 2005: Introductory Meeting

This was the first meeting held to acquaint the workgroup participants and initiate discussion about all of the air emission sources assigned to the Homes and Restaurants Workgroup. See Appendix 1a for the meeting minutes and Appendix 2a for the data and references reviewed.

2. July 13, 2005: Indoor Wood Burning

The purpose of this meeting was to address indoor wood burning, particularly done in residential areas. Specific indoor wood burning appliances discussed were new and existing wood stoves and fireplaces, in addition to pellet stoves and using natural gas or propane. See Appendix 1b for the meeting minutes and Appendix 2b for the data and references reviewed.

3. July 27, 2005: Outdoor Wood Burning

The purpose of this meeting was to address outdoor wood burning practices, including open burning regulated by the New Jersey Administrative Code (NJAC) Title 7, Chapter 27, Subchapter 2 - Control and Prohibition of Open Burning. Other major topics included neighbor-to-neighbor complaints, public education, chimeneas, fire pits, and outdoor wood boilers. See Appendix 1c for the meeting minutes and Appendix 2c for the data and references reviewed.

4. August 17, 2005: Restaurants and Other Sources

The air emission sources addressed by this meeting included restaurants and other sources of residential and commercial fuel combustion. The New Jersey Board of Public Utilities (NJBPU) explained their applicable energy efficiency and renewable

energy rebate programs. See Appendix 1d for the meeting minutes and Appendix 2d for the data and references reviewed.

5. September 14, 2005: Wrap-Up and Review

The final meeting of the Homes and Restaurants Workgroup served to address any outstanding issues raised during the previous meetings or any topics missed that should have been addressed by this workgroup, finalize the workgroup's recommendations for further investigation, and review the comprehensive table of strategies. See Appendix 1e for the meeting minutes and Appendix 2e for the data and references reviewed.

V. Initial Workgroup Control Measure Considerations

A. How the Workgroup Focused its Analysis on Control Measures (e.g., which categories would best provide for significant reductions or could be easily implemented)

Based on the information presented in Sections I and II, the workgroup focused on addressing the major wood burning units that were contributing to the high emissions for the residential wood combustion category. Fuels used by homeowners also included natural gas and oil, which also were shown as top emitters in the New Jersey air emission inventory. Some of the strategies addressing these sources overlapped and would have more of an impact on these emissions if the strategies discussed incorporated residential fuel combustion practices in general. As such, renewable energy and energy efficiency strategies were chosen because of their potential beneficial impact on reducing fuel consumption by homeowners. The air emission category for restaurants was limited to cooking operations and equipment and any potential strategies that could reduce emissions in these areas were reviewed. By the nature of the restaurants that are contained within the area source category, smaller restaurants were a major focus of the strategy discussions.

B. Control Measure Evaluation Process

All strategies were reviewed initially, to the extent possible, for:

- Environmental Benefits
- Technical Feasibility
- Economic Feasibility
- Implementation Feasibility
- Social Benefits/Environment Justice (EJ)
- Enforceability

Other comments and missing data for the ideas were also included in the initial analysis.

C. Control Measures Evaluated based on Section V, B (See summary tables in Appendix 3)

Every suggestion raised by any workgroup member was listed in the comprehensive tables in Appendix 3. Ideas were briefly introduced during the first meeting and these and other new ideas were elaborated on in the subsequent topic meetings. As such, there are five tables that address each topic separately: indoor wood burning, outdoor wood burning, strategies that involve indoor and outdoor wood burning, restaurants, and 'other' ideas that included residential and commercial fuel combustion. After conducting an initial analysis of each strategy based on the criteria is subsection B of this section, the most promising strategies were chosen and are discussed in Section VI by grouping individual strategies under general themes (i.e., wood burning, restaurants, low sulfur home heating oil, energy efficient standards for new homes and new construction, and communication).

VI. Detailed Review of Promising Control Measures

The following discussion is a detailed review of the strategies developed by the Homes and Restaurants Workgroup. The workgroup thinks that these strategies are the most promising to implement in New Jersey to improve the quality of the air. Each strategy is discussed separately presenting more supporting details than the preliminary analysis in Section V. For example, some of these details may include a discussion on ways to reduce emissions from some or all of the relevant pollutants, potential implementation issues, or potential impacts on other air pollutants (e.g., toxics) and other media (e.g., water). Some of the strategies have been grouped together under general topics that will cover multiple source categories. The individual measures are then listed for each general topic.

Table 1. Summary Table of the Promising Strategies Developed by the Homes and Restaurants Workgroup

Issue: Nonattainment in New Jersey for 8-hour ozone and $PM_{2.5}$

Desired Outcome: Reduce air emissions from wood burning, restaurants, commercial and industrial buildings, and residential fuel combustion.

Strategies (Not in priority order)

	Indoor Wood Burning	Outdoor Wood Burning	Restaurants	Other sources of residential or commercial fuel combustion
A. Public education and outreach	x	x		x

B. Conduct a regional wood stove change-out program (voluntary or upon sale of home/property)	x			
C. Create standards for wood burning equipment	x	x		
D. Investigate changing Subchapter 2 to decrease the amount of open burning performed under permits in New Jersey		x		
E. Require low sulfur fuel oil for heating				x
F. Homebuilders – Energy Efficiency				x
G. Investigate controls on certain restaurant operations, building particularly on the work done in California			x	
H. Address the growing number of neighbor-to-neighbor complaints from indoor and outdoor wood burning activities	x	x		

The Homes and Restaurants Workgroup focused its discussions on several areas including the burning of wood inside and outside the home, open burning activities conducted under Subchapter 2, home heating emissions from furnaces, home energy efficiency improvements, and restaurant emissions. Quality of life issues from wood burning activities (e.g. neighbor-to-neighbor smoke complaints) were also discussed.

WOOD BURNING

The burning of wood in the home setting is a significant source of directly emitted fine particulate matter in the State of New Jersey. While concerns of the accuracy of New Jersey's inventory are present,[1] the quantity of emissions from these sources makes the activity of wood burning a prime focus for future investigation of control for NJDEP. The workgroup concluded that the State should balance the ability of private citizens to

[1] Uncertainties in the inventory for residential fireplaces include the emission factors available from the USEPA; the percent of older, more polluting fireplaces versus the newer, USEPA-certified fireplaces in the State; the percent of wood burning units versus natural gas units; the location, type and number of fireplaces in each county; and the activity levels for wood burning in each county. Despite these uncertainties, the best information available was used to develop New Jersey's inventory.

enjoy their home environment while maintaining their neighbors' right to breathe clean air. We believe that the proposals outlined below will do just that.

Conduct a Wood Stove Change-Out Program (N4)

The workgroup strongly suggests that the NJDEP conduct a voluntary wood stove change-out program in conjunction with the member retailers of the Hearth, Patio, and Barbecue Association (HPBA). These change-out programs have been successfully conducted in many parts of the country and the HPBA has agreed to conduct one in this State or to do it regionally. A homeowner voluntarily agrees to replace older (i.e., manufactured before 1992) wood stoves or fireplace inserts with a newer, lower polluting unit that is certified to meet USEPA standards. Retailers offer a discounted price during the period of the change-out program. Provisions are made to ensure the older unit is removed for recycling and destroyed. This type of program will accelerate the change-over to cleaner burning units and reduce the current high level of emissions from these units.

This program should be conducted through a regional planning group, such as MARAMA, so that it takes place by media market and among several states within the media market. For example, New Jersey, Pennsylvania, and northern Delaware should participate in the program so that advertising can be done through radio and television markets that reach these three states. Also, this change-out program should be done after New Jersey, and possibly the other States surrounding New Jersey, considers adopting standards for lower emitting wood stoves and fireplace inserts like those adopted for Washington and Oregon (see below) so that a maximum air quality benefit is obtained.

Natural gas or propane fireplaces are very attractive to homeowners who desire a fireplace for aesthetic reasons rather than as a heating source for their homes. For those areas of the State that are not in attainment of the fine particulate standard, replacement of wood burning units with much cleaner burning natural gas or propane units should be given emphasis. A rebate program from New Jersey's public utilities, such as PSE&G, for changing to natural gas should also be investigated as an added incentive to the HPBA backed effort.

One issue that also needs to be addressed prior to conducting the program is permitting the homeowner to change-out their own wood stove or fireplace insert in their own dwelling. Improperly installed units can be a fire hazard and may not work as efficiently. It is suggested that only trained retailers and homeowners, who properly obtain a construction permit from their local municipality prior to the change-out, be allowed to install units during the change-out period. The State could develop a range of average installation costs (depending on the complexity of the change-out) in conjunction with the retailers so as to ensure that the homeowner is given a fair price for installation. An inspection by the local municipal construction department is required as part of the

construction permit and would ensure the proper installation by the retailer or homeowner.

There was strong consensus from the workgroup that the costs, social and environmental impact, technical feasibility, and authority to conduct the program merit conducting the program. The workgroup also suggested additional funding or rebates for low-income families to change out their wood stoves (when used to heat a home) to avoid concerns with environmental justice. Other states and areas conducting this type of program provided assistance to low-income families.

Adopt Similar Standards for Wood Burning Stoves and Fireplace Inserts as Adopted by Washington and Oregon (N7, N8, N10)

Wood burning stoves and fireplace insert standards, more stringent than the current USEPA standards, were adopted by the states of Washington and Oregon. These standards for fine particulate matter are about half of the current USEPA standard and apply to any new unit sold in the State. According to one member of the workgroup, manufacturers of these units have not had a hard time complying with these standards and most units in the country already meet these reduced levels. To ensure that only the lowest emitting units are sold in the State, New Jersey should investigate adopting similar emission standards as Oregon and Washington.

There was consensus from the workgroup that the costs, social and environmental impact, technical feasibility, and authority to conduct the program merit this suggestion. If DCA were to cross-match these standards in the State's Uniform Construction Code, they would need the authority from NJDEP or a new statute.

Investigate the Possibility of Requiring Only Natural Gas or Propane Fireplaces in New Construction (N1b –N3)

Natural gas or propane fireplaces emit much less particulate matter than wood burning units. For homeowners wishing to have the beauty of a fireplace in their homes, but avoid the negative issues that burning wood brings (e.g., obtaining and storing wood, clean-up of ashes, indoor odors), a natural gas or propane fireplace insert is an attractive alternative. The workgroup discussed the possibility that, for all new construction proposing to install fireplaces or fireplace inserts,[2] only natural gas or propane burning units could be installed. Discussion occurred on whether this recommendation should affect all new construction or only developments over a certain number of units (e.g., 5 or 10 new homes).

It was also mentioned that natural gas supply lines are not available in every community in the State. So even if a homeowner wanted to convert their wood burning fireplace to

[2] Note that this suggestion only pertains to fireplace inserts and not to wood stoves. Wood stoves are used to heat or supplement heat in a home and are not specifically designed for aesthetic purposes. Wood stoves are not included in this recommendation.

natural gas, they may not be able if a natural gas supply is not available to their home.[3] In these areas, a propane tank could still be used for the fireplace, but issues of safety and aesthetics (i.e., a propane storage tank would be stored outside the home) were raised. The suggestion was further narrowed to provide that, if natural gas was available in a given area or could easily be supplied to the area, then the homebuilder or homeowner would have to use natural gas, liquid propane (LP) gas, or propane.

Concerns were raised that the NJDEP should not mandate a fuel type or source (as this potentially effects the supply/distribution/price of natural gas and other fuels) or take away the choice of a homeowner to burn wood in their home. Offsetting this concern was the fact that these units are primarily for aesthetic use and do not provide an appreciable source of heat to a home.

There was some consensus from the workgroup that the costs, environmental impact, and technical feasibility merit this suggestion. Legislation may be needed if this suggestion was implemented. Disagreement of the social aspects of mandating that a new homeowner cannot burn wood in a fireplace was meted with a potential reduction in homeowner complaints in new housing developments from wood burning activities as natural gas or propane does not produce the smoke that a wood burning unit does.

Require the Change-Out of Wood Stoves or Fireplace Inserts that Do Not Meet Current USEPA Standards (i.e., Units Built Prior to 1992) Upon the Sale of a Home (N6)

The NJDEP should investigate legislation to require a homeowner or commercial property to replace older, pre-1992 wood stoves or fireplace inserts with newer, USEPA-certified units at the time that the property is sold. A home inspection at the time of sale for post-1992 units should also be conducted to see if the units are working properly. It is suggested that real estate agents also be provided with brochures, fact sheets, and other information that they could provide new homeowners on the importance of proper operation and maintenance of their wood stove or fireplace.

There was general consensus from the workgroup for this effort but the social acceptability of this idea by New Jersey's citizens was a concern. It was suggested that this change-out at time of sale be made an optional requirement, left to the discretion of the buyer and seller after being provided information by the real estate agent on the need to change older fireplaces to newer units. In either case, this suggestion should be explored.

Increase Regulation of Outdoor Wood Burning Activities:

Over the years, a growing trend in homeownership is to burn wood in yards for ornamental reasons. Firepits and chimeneas have become increasingly popular in the

[3] An attempt to discover the location of natural gas supply pipelines to individual homes or areas in New Jersey was unsuccessful.

most densely populated State in the nation. Another new source of emissions come from outdoor wood boilers used to heat hot water that in turn heats the home. As their use has grown, a growing number of citizens have turned to local, county, and state government to get relief from the activities of their neighbors. Often these people complain of respiratory or breathing difficulties from the wood smoke and state that they must close all their doors and windows when their neighbor burns wood in their yard. While regulating this activity (as to the time, quantity, or type of material burned) will not greatly improve the overall air quality in the State, the quality of life issue for some New Jersey citizens will be improved if New Jersey creates a sensible and practical policy.

a) Allow Local and County Governments the Ability to Regulate Outdoor Wood Burning in their Communities (B8 – 12, O15)

Most workgroup members were under the impression that New Jersey's Air Pollution Control Act (APCA) prevented homeowners from conducting open burning activities, such as leaf burning, at their homes. There was also a belief that municipalities could regulate outdoor wood burning activities in their communities through the New Jersey Air Pollution Control Act. Neither case is true. The New Jersey Air Pollution Control Act specifically exempts one and two family dwellings from its provision effectively removing NJDEP and some CEHA agencies as an enforcement arm from its coverage. A 1995 amendment to the Act also removed the ability of a municipal or county government to pass an ordinance more stringent than the State law. While a county or municipality could possibly use the authority of a general nuisance or health statute to regulate outdoor wood burning, it is unlikely that they have done so. The result is that a seemingly growing number of residents are becoming exasperated by the inaction of government at all levels to solve their health and quality of life issues with breathing wood smoke. NJDEP policy is to pass these complaints to the county and local health agencies. The county and local agencies, for the most part, are powerless to intervene in the absence of county or municipal ordinances.

It is recommended that the solution to this issue is best addressed by a multi-faceted approach. The first should be to pass legislation, similar to that enacted in Connecticut (see the Outdoor Wood Boiler discussion), that restricts outdoor wood burning within a certain distance from the property line and sets a minimum stack height from which one can conduct outdoor wood burning. This will effectively preclude the activity from occurring in some of the most densely populated parts of the State and within the towns that have the greatest likelihood of experiencing neighbor-to-neighbor effects. Secondly, the APCA should be changed to allow for county or local ordinances that restrict or prohibit this activity within all or sections of their municipality or county. This will place the authority and responsibility at its proper place at the local level. Thirdly, consideration of whom will enforce these provisions should be made with discretion given to the state, county, and municipalities to have enforcement by a combination of health, environmental, police, or fire officials at the discretion of the county or local agency. This last consideration must establish a clear line of authority and

responsibility to enforce the local laws so that a homeowner clearly knows whom to contact to resolve the issue.

In general, there was strong consensus for this approach. Discussion of the workgroup centered on the priority that this recommendation should be given in this report as the issue involves mainly quality of life concerns. However, as some of those being affected by the wood smoke also complain of suffering from respiratory or other disease where the symptoms are exacerbated by the wood smoke, there could be a health-related aspect at the individual level. There was also a concern over prohibiting any activity in a home setting. However, if the activity is limited for good cause, for instance, due to high population density or closeness to a neighbor's property, the public could accept the reasoning and the ordinance may pass legal muster.

As a general note for all wood burning activities, the type of material burned in the home environment was also raised as a concern. Dry, seasoned wood offers the best burning characteristics, having the least potential for excess smoke and odors. Leaves, municipal refuse, wet wood, home generated hazardous waste, and other refuse were discussed as potentially problematic materials that could be burned by a homeowner. It was suggested that local measures and enforcement could ensure that only dry, seasoned wood be allowed in the home setting. (See also Communication efforts in this area.)

b) Regulate Outdoor Wood Boilers (O12 – O15)

As the price of oil and gas in the Northeast continues to rise, more people are turning to wood burning as a way to heat their homes in the northeastern states. Outdoor wood boilers are becoming an increasingly popular alternative in areas where wood supply is plentiful. While there are a small number of these units currently present in New Jersey, it is thought that they may become more prevalent in the future. Emissions from wood boilers are currently not regulated at the national level and several northeastern states have petitioned the Administrator of the USEPA to establish emission limits or standards for wood burning boilers.

The Homes and Restaurants Workgroup discussed the use of these units and discussed the idea of banning their use in the State. The general consensus of the workgroup was to not ban the use of these units but to establish emission standards and regulations to adequately lower their emissions. It was thought that banning the units in the State would prematurely stop the pursuit of cleaner burning units or air pollution control technology for these units, take away one of a homeowners options for heating their home, and serve as a disincentive for use of a "renewable" energy resource.

The approach taken by the State of Connecticut was discussed as a common sense way of dealing with the issue. In Connecticut, legislation was passed that limited the location of these units to within a certain distance from the property line, effectively

banning their use in more densely populated communities. Minimum stack height was also regulated. One participant stated that this was a stop gap measure until the USEPA could develop emission standards for wood burning boilers. Another mentioned that local governments could administer a local permit program for these units to ensure that they are located properly and meet the building codes after the NJDCA adopts standards pursuant to the Uniform Construction Code.[4] The workgroup strongly suggests that the New Jersey Departments of Environmental Protection and Community Affairs investigate these ideas and continue its pursuit of the creation of emission standards through the USEPA.

There was a general consensus of the workgroup to adopt one of the approaches described previously for regulating outdoor wood boilers.

Cross-reference USEPA / NJDEP Emission Standards for Wood Stoves, Fireplace Inserts, and Wood Burning Boilers in NJDCA's Uniform Construction Codes and Require Proper Training for Installers (N8 and N9)

It is suggested that if the NJDEP adopts emission standards for wood stoves, fireplaces, or outdoor wood boilers, then the NJDCA should cross-reference them in the State's Uniform Construction Codes. Also, all contractors and installers of wood boilers, pellet stoves, and fireplace inserts should be required or encouraged to attend training courses offered by the National Fireplace Institute[5] to ensure proper installation. This not only ensures that air pollution is minimized but that the unit is also installed safely.

Investigate Changing New Jersey's Open Burning Regulation to Restrict the Types of Burning that can be Conducted by Permit (O1)

Open burning in New Jersey is regulated by Subchapter 2 of New Jersey's Administrative Code (N.J.A.C. 7: 27- 2 et seq.). People can conduct open burning as long as the provisions of the subchapter are met. Namely, a permit must be obtained and the reason for conducting the open burning must match specified criteria. Specific changes to the regulation are described in the following text.

Prohibit Open Burning on Days of Forecast Unhealthful Air Quality (O2, O7)

New Jersey has begun to condition all permits for open burning to prohibit open burning on days of forecasted unhealthful air quality. Permittees must check the air quality forecast within 24 hours of conducting the open burn and not conduct the burn on days of forecasted unhealthful conditions. The NJDEP should ensure that all permits issued for open burning for whatever reason are conditioned in this manner and should

[4] The New Jersey Department of Community Affairs should develop standards for wood burning boilers within the Uniform Construction Code so that local governments can ensure that these units are not only sited properly but also safely constructed and located at some minimum distance from a household air intake.
[5] Information on the training courses offered can be found at http://nficertified.org/ndx2.cfm

investigate adding this condition to any other "discretionary"[6] activity conducted by an air pollution permit (e.g., stack testing requirements).

Some states do not allow any open burning during the summer months when the highest levels of ozone and, at times, fine particulates are experienced, thus confining the activity to the remaining three seasons. While this suggestion may not lower the mass of air pollution emissions in a given year (as the emissions are just delayed until another season), the emissions will not exacerbate the already bad forecast and contribute to a more serious air quality condition. Limits on summertime open burning, except for emergencies or for prescribed burning, should be investigated further.

There was general consensus of the workgroup that prohibiting open burning on days of forecast unhealthful air quality was feasible.

Require the Removal of Items that can be Commercially Sold or Recycled Prior to Conducting an Open Burn (O3)

A suggestion of the Bureau of Forest Fire Management was to require permit applicants to remove any item from the property that could be commercially sold or recycled prior to conducting the open burning activity. This will reduce the amount of material that is burned thereby reducing the quantity of emissions.

There was general consensus of the workgroup that this was feasible.

Limit the Issuance of Open Burning Permits for Infested Plant-life (N.J.A.C. 7:27-2.5), Herbaceous Plant-life and Hedgerows (N.J.A.C. 7:27-2.9), for Orchard Prunings and Cullings (N.J.A.C. 7:27-2.10), and for Land Clearing (N.J.A.C. 7:27-2.11) (O4, O5, O6)

Under these subchapter provisions, any person can apply for an open burning permit to reduce plant material on his or her property. It is suggested that these provisions be more closely limited to ensure that open burning is not a considered "alternative" when other methods of disposal are available. Specifically, it is suggested that:

- Open burning for land clearing should not be allowed when it is occurring to make way for housing developments or other non-agricultural purposes. It should only be allowed when the land is being used, or will be used for a set period of time, for example, 10 years, for agricultural purposes.
- Open burning for infested plant life, herbaceous plant life and hedgerows, orchard prunings and cullings, and for land clearing should be limited to only those persons having a farm eligible for farmland assessment (i.e., those greater than 5 acres in size). It was the consensus of the workgroup that owners of smaller properties have many alternative ways to dispose of plants

[6] One could argue that a permit requirement like "stack testing" is not discretionary as an applicant must do it as a condition of the permit issuance and this is true. But what is discretionary is determined on the exact day upon which the stack test is conducted.

and associated debris by recycling/composting a smaller quantity of material or conditioning a smaller piece of land.
- Open burning for the reasons above on properties containing mature trees should be prevented. These trees may be able to be cut-down and sold rather than burned.
- Open burning of infested plant-life should be limited to address severe infestation only (as determined by accepted silvicultural practice or best management practices) and limited to when no other viable way to control the infestation is available.

Limit the Number of Open Burning Permits Issued for a Given Time Period and Location (O7)

Open burning permits can also be limited within a region as to the number of permits issued in a given time period or to the size of the burning to be conducted or to the type of plant-life being burned. Emission "budgets" could be developed for a given region of the State and permits could be denied or postponed if the budget was to be exceeded. This could help ensure that air quality is maintained in the area and that unhealthful air quality in a localized area does not occur.

Increase the fees and fines collected for open burning (O8)

Both as deterrence to people considering open burning as a viable alternative to other means of disposal and to properly fund the activities of permit issuance by the NJDEP, the fees associated with open burning permits should be increased. An increase in fines to make illegal open burning less attractive should also be investigated.

RESTAURANTS

Given that there are over 16,000 restaurant establishments in the State,[7] emissions from the cooking and preparation of food are considered sizeable enough to generate attention. The Homes and Restaurants Workgroup first considered what was done elsewhere in the nation and then considered whether any more emission reductions could be achieved from this category. The following ideas are presented for consideration.

Consider Adoption of Emission Standards Similar to California's Standards for Chain-Driven Charbroilers and Other Operations (R2, R3)

After lengthy review and study, California adopted air pollution controls for chain-driven charbroiling operations. Of all the types of restaurant cooking operations reviewed, it was determined that only chain-driven charbroiling operations merited the addition of

[7] The New Jersey Restaurant Association notes that the number of restaurants and "eating and drinking" establishments are over 22,000 in the State. Drinking establishments where food availability and service is minimal have been subtracted from this number.

cost-effective air pollution controls.[8] Air pollution controls on other types of cooking processes were determined to not be cost-effective or to result in minimal environmental benefit.

Discussions of the workgroup centered on the merits of California's regulation compared to restaurant operations in New Jersey. Differences in the cooking processes (e.g., broiling versus frying), in the number of restaurants in New Jersey compared to California, and in the climate and activity between the two states were also discussed. At a minimum, the NJDEP should investigate the possibility of adopting a regulation similar to California to reduce particulate emissions from charbroiling. More specific data on the number, type, and location of the restaurants proposed to be controlled, as well as a detailed review of the scientific data underlying California's regulation, should be obtained prior to the regulatory proposal.

Some members of the workgroup felt that it may be possible to go beyond the controls adopted in California and to control other sources such as deep fat fryers or other cooking methods. It was suggested that this effort be confined to deep fat fryers and to meat broiling or charbroiling (as these produce much more emissions than meat frying). The use of Smog Hogs™ and catalytic controls on some operations should also be investigated as well as the social impacts and the proximity of the restaurant to highly populated residential areas. One member of the workgroup provided a report showing emission factors for different restaurant type operations.[9]

With the understanding that the regulatory development process would answer the majority of the questions raised here, there was a general consensus for moving ahead with this suggestion to form a follow-up workgroup to begin development of a proposed regulation addressing these sources.[10]

LOW SULFUR HOME HEATING OIL

All fuels contain some percentage of sulfur as a natural contaminant of the fuel with the percentage varying depending on the type and source of the raw fuel. The sulfur in the fuel after combustion is emitted primarily as gaseous sulfur dioxide that converts by a series of atmospheric reactions into a liquid particulate form called ammonium sulfate. Ammonium sulfate is a large component of the fine particulate matter in New Jersey making up 35 to 70 percent of the fine particulate matter found at the NJDEP monitoring sites throughout the State. Lowering the sulfur content of the fuel, beyond the current sulfur in fuel levels found in New Jersey regulation,[11] would lower the largest fraction of fine particulate matter found in the State.

[8] California's charbroiling regulation may only effect Burger King fast-food chain (and one other food-chain not thought to have stores in New Jersey) as they are the only chain thought to cook their food by charbroiling.
[9] Prepared by E.H. Pechan and Associates for the USEPA
[10] However, members of the Burger King Corporation, most effected by a potential regulation of charbroiling emissions, were invited but chose to not attend these workgroup meetings. The NJDEP should reach out again to Burger King representatives if it chooses to develop a regulation similar or more stringent than California's.
[11] NJAC 7:27-9 et seq.

However, lowering the sulfur content of fuel only in New Jersey would not have the greatest benefit on fine particulate matter levels within the State. Ammonium sulfate is termed a secondary pollutant because it forms in the atmosphere and is not released directly from a source. It takes time (and distance) in the outside air to form from its gaseous precursors into its particulate form.[12] Therefore, the greatest benefit from a lower sulfur fuel standard would be found if the standard was adopted regionally by all states surrounding New Jersey.

Lower Sulfur Home Heating Oil (Z1)

There are current standards in New Jersey, and in all surrounding states, for the acceptable quantity of sulfur in number 2 fuel oil, also called home heating oil or diesel fuel. These standards differ between states leading to a myriad of different fuel oil standards in the northeastern United States. The standards are also different for the uses of the number 2 fuel oil as to whether it is used for home heating or for diesel fuel. Refineries have begun producing a lower sulfur content diesel fuel for use in newer heavy-duty diesel engines.

The workgroup came to consensus that the sulfur content of number 2 fuel oil used for home heating or any other use should be lowered to that used for diesel fuel so that the standard is consistent between the different uses. Concerns of the refiners and suppliers were presented.[13] These included concerns over the timing of the implementation of the new standard, concerns with a consistent level for the standard, concerns over potential disruption in the supply chain from differing demands between states (if one or two states alone development more stringent standards), disruption of imports from other countries, and disruption during emergency events or unusual weather conditions. The workgroup agreed that this regulation should be done regionally to have the greatest benefit on New Jersey's air quality.

Concerns over the timing of implementation of a regional sulfur in fuel standard should also be worked out prior to moving ahead with a regional initiative. There was a general consensus that the social, environmental, technical feasibility and cost-benefits of this type of regulation were high.

It should be noted that the suggestion here is for a consistent sulfur content in all number 2 fuel oil sold in the State which is consistent with the current way New Jersey's regulation is structured. Thus, all fuel oil that meets certain specifications (e.g., viscosity) is considered number 2 fuel oil regardless of where it is used. Some electric generating facilities, industrial and commercial boilers, and other steam boilers also

[12] In one calculation done by the NJDEP, only 5% of the gaseous SO_2 released from a source in Mercer County converted to the particulate form by the time it reached a receptor location in Hudson County.
[13] Representatives of the refineries or oil producers were invited but did not participate in this workgroup. The concerns of the refiners or oil producers (as represented here) were presented by another workgroup participant familiar with the NESCAUM proposal to develop a regional sulfur in fuel standard.

burn number 2 fuel oil. Applying the regulation to all uses of number 2 fuel oil will give the maximum environmental and cost benefits to the State.

ENERGY EFFICIENCY STANDARDS FOR NEW HOMES AND NEW CONSTRUCTION

Emissions throughout the State can be indirectly lowered by the use of energy conservation methods or the on-site generation of renewable energy. A reduction in home energy use avoids having to produce the electricity at a power plant and lowers emissions at the point of origin, as less energy would need to be produced to meet electrical demands. A home properly constructed to conserve heat and air conditioning, or using a geothermal heating/cooling source, uses less fuel or gas, thereby reducing air emissions. New Jersey is a leader in the country in the funding for home energy conservation measures and clean energy requirements. The suggested areas of investigation in this category include the following.

Require Homebuilders to Offer the Homeowner the Option of Constructing their New Home with Energy Conservation or Clean Energy Features prior to Construction (Z5, Z6)

The workgroup suggests homebuilders offer homeowners the option of constructing his or her new home with energy conservation or clean energy features prior to all new construction. It was felt that with the instant rebates and funding offered by the State and the increased attractiveness to sell these homes, the majority of the homeowners would opt to install geothermal systems (heat pumps), solar panels, or other energy conservation measures at the time the home is built. It may also be cheaper for homeowners to put these features on their homes before they are built. Homebuilders would be required to inform the potential homeowner of the existence of the NJBPU program to offset the costs of these features and make the homeowner sign a waiver if the features are not installed. The workgroup felt that this voluntary program would be better than mandating that all new construction add these features.

However, the State should consider mandating that all or a certain percentage of new homes in housing developments over a certain size (i.e., 2 or 5 or 10 units) contain these features when a homeowner has not yet been identified to make the decision. Also to be considered is a requirement to only allow for the placement of Energy Star efficient appliances within these developments. In either case, new legislation may be required to implement these ideas.

To offset any potential environmental justice concerns, the workgroup also suggests that the State consider a higher rebate for low income housing so that the cost of construction for these units does not increase. Also, the energy saving features of this program (lower electric and heating costs) will make the units more affordable for the low-income family to live within on a yearly basis. Finally, the State could mandate that builders meeting their obligations to provide a certain percentage of affordable housing

must also add energy conservation features to these units to make them even more affordable for the low-income family.

Continue or Expand Funding of the Rebates for Construction of Solar Panels or Other Energy Saving Devices (Z2, Z7)

The State currently provides for rebates and other financial incentives to install energy efficiency measures in a home. The workgroup felt this program was extremely beneficial and made the addition of these features a cost-effective measure for the homeowner. Without the rebates and financial incentives, it was felt that use of these features would diminish. Continued funding, at increased levels if possible, should occur. Expansion of the financial incentives of the program, through the public utilities, could also be investigated. Added incentives to homebuilders, through the NJBPU, could also be explored. The percentage amount of the rebate may also decrease over time and the current implementation rate in relation to cost should be assessed before this reduction occurs.

It was suggested that the existing rebate program be expanded to ensure greater participation by existing homeowners. This strategy could lower the existing demand for electricity, offset future growth sources, and possibly lower existing emission levels.

There was a strong consensus from the workgroup to support this effort.

Investigate Increasing the List of Energy Star Rated Appliances (Z9)

The workgroup stopped short of mandating that only Energy Star rated appliances could be sold in the State as the possible increased cost of these appliances to low income families may be prohibitive. But the workgroup suggests looking at the types of appliances currently covered by the Energy Star program (e.g., refrigerators, stoves) to see if other types of appliances could also be given an Energy Star rating.

Mandate the Addition of Clean Energy and Conservation Features for New Commercial and Industrial Buildings (Z8)

While many on the workgroup felt that mandating energy conservation features on all new homes was unwise, general consensus was present that it could be mandated on certain types of new commercial and industrial development or modifications thereto. The larger users of electricity are often offered reduced electrical prices by the utilities, and the installation of energy efficiency measures, appliances, or renewable energy improvements could be required for these and other businesses. Along with the rebate program currently offered by the State, it was felt that it would be in the best, long-term interest of the businesses to install energy conservation features that would pay for themselves over time. New legislation may be required to implement this idea.

COMMUNICATION

The workgroup raised several ideas and suggestions related to better communication of the need for additional control measures, the availability of existing programs, and the requirements to be met by homeowners and the regulated community. These suggestions cross into all areas investigated under the Homes and Restaurants source categories and are as follows.

Develop Brochures and Handouts to be Distributed with any Purchase of Wood Burning Equipment Sold in the State (B2)

The workgroup suggests developing brochures, fact sheets, pamphlets, or other handouts to be distributed at the retail level to anyone purchasing an indoor or outdoor wood burning appliance. To be communicated to the public is

- the need for proper maintenance and cleaning of their wood burning equipment,
- the need to burn only dry, seasoned wood in the appliance,
- the need to avoid burning wood on days of forecast unhealthful air quality, and
- the importance of buying only appliances that meet USEPA or State standards.

Develop Brochures and Handouts to be Distributed by Real-Estate Agents prior to the Sale of any Home Containing a Wood Burning Appliance (B2, N6)

The workgroup suggests developing brochures, fact sheets, pamphlets, or other handouts to be distributed by real estate agents that asks the homeowner to ensure that they have a newer, more efficient burning wood stove (post-1992 model) and to replace that model if they have an older unit. If the suggestion to require a change-out at the time of sale is accepted, then the brochure should be similar to the one above but also stating why the change-out was important.

Developing Television and Newspaper Ads, Brochures, Fact Sheets, Pamphlets, or Other Handouts to be Distributed with the Wood Stove and Fireplace Insert Change-Out Program (B2, N4)

This communication effort, developed for the mass media market, would state the availability of the wood stove change-out program for a certain limited time. This type of communication has already been prepared for the wood stove change-out programs in other states and can be built upon.

An Education and Outreach Effort using Traditional and Non-Traditional Avenues of Communication should be Explored (B3)

The workgroup suggested that in addition to traditional avenues of communication, such as those mentioned above, non-traditional avenues of communication should be explored to communicate the need to reduce wood burning and other activity, especially on high ozone days. These non-traditional areas include, but are not limited to, daycare centers, schools (PTA/PTO's), hospitals, community centers, scouting organizations, and restaurants.

Increase Efforts to Inform the Public of the Availability of the Home Energy Rebate Program and Financial Incentives (Z2)

Most workgroup members were unaware of the attractiveness of the rebates and financial incentives given to homeowners to add energy efficiency improvements to their homes or how they could use this type of program. It was thought that the majority of New Jersey citizens were similarly unaware. The workgroup suggests that the communication efforts for this program be evaluated and improved, if needed.

A partnership to inform customers of the availability of the home energy efficiency rebate program with retail chains, such as Home Depot, was also discussed as a possibility as this was done in other states. In this case, the retailer is the point of contact for the homeowner and prepares the necessary paperwork for the rebate to ease the paperwork requirement on the customer. The workgroup suggests that this be investigated.

VII. Summary of "Parking Lot" and Crossover Issues

This section outlines the topics that were raised during the workgroup meetings that either were not directly covered under the source categories assigned to the Homes and Restaurants Workgroup or were, or were not, covered under the source categories of another air quality workgroup (i.e., Diesel Initiatives, Gasoline Cars and Trucks, Non-Automobile Gasoline Engines, Stationary Combustion Sources, or Volatile Organic Compounds from Processes or Consumer Products).

1. Lowering the Sulfur Content of Number 4 and 6 Fuel Oil or Requiring Number 6 Fuel Oil Users to Change to Number 4 Fuel Oil if Number 2 Fuel Oil Sulfur Content is Lowered

The following technical issue should be addressed when addressing lowering the sulfur content of number 2 fuel oil. However, it was not discussed in detail within the Homes and Restaurants Workgroup, as it does not directly reflect the interests of the majority of the members of the workgroup. However, it is a natural follow-up for consideration should the suggestion for a regionally consistent, lower sulfur number 2 fuel oil be accepted.

Number 6 fuel oil is a heavier grade of fuel oil sometimes used by electrical generating facilities to produce steam. It has a higher allowable sulfur level than all other fuel oils. Number 4 fuel oil is a blend of number 2 and number 6 fuel oil and is also used by electrical generating facilities and some industrial applications. If the proposal to create a consistent lower sulfur content of number 2 fuel is accepted, the sulfur content of number 4 fuel oil should be lowered too as the lower sulfur number 2 fuel is blended with higher sulfur number 6 giving a lower sulfur content in the product. The NJDEP could then consider either requiring all number 6 fuel oil users to use number 4 fuel oil or consider lowering the sulfur content of number 6 fuel oil so that sulfur dioxide emissions are reduced across the board.

2. Neighbor-to-Neighbor Complaints for Residential Wood Smoke

The workgroup agreed by consensus during the meeting held on July 13, 2005 to expand their "mission" to also address localized "neighbor-to-neighbor" health and aesthetic-related air quality issues from residential wood burning. There was a concern that someone needs to adequately address these issues because of the local air quality impacts. Discussions took place at the July 27, 2005 meeting during which recommendations for further consideration were formulated (see pages 14-16).

3. Restaurant Grease Used as an Alternative Fuel

During the meeting held on August 17, 2005, a strategy that could reduce costs for waste disposal for restaurants while producing environmental benefits was discussed. The strategy involves using restaurant grease, known as "yellow grease," to make B20 and B100 blends for an alternative diesel fuel that can be processed by the Philadelphia company, Fry-O-Diesel. Unfortunately, there was no representative from the company to elaborate on the processing, distribution, and infrastructure issues that were raised by some of the workgroup members. The workgroup decided that the issue should be discussed further in another workgroup that is reviewing or discussing alternative fuels since the restaurants would only be supplying the energy source and neither restaurants nor homes would be using the fuel produced.

The Diesel Initiatives Workgroup was informed that the Homes and Restaurants Workgroup was discussing the idea and suggested that the Homes and Restaurants workgroup solicit information from the municipal utilities authorities (MUAs) since grease is a significant environmental problem for water quality [7]. The Diesel Initiatives Workgroup was not necessarily looking at specific vendors of alternative fuels but was discussing alternative fuels in general (please refer to the Diesel Initiatives Workgroup report for further information). Another medium that restaurant grease affects is solid waste. Disposing of the grease is expensive for the restaurants and indirectly creates an air quality issue when the grease is incinerated at the solid waste management facilities.

4. Potential Air Emission Inventory Improvements for the Restaurant Operations Category (SCC 2302002200)

During the meeting held on August 17, 2005, the air emission inventory for the restaurant operations category was briefly discussed. A perspective represented by some of the workgroup members entailed improving the current emissions data on restaurants to allow for more effective control strategies. Since the calculation methodology used was based on Southern California's method, the workgroup members stated that the calculation, adjusted using New Jersey's population, was not as accurate as it could be to represent the air emissions in New Jersey. Since calculating new air emissions is outside of the scope of the workgroup effort, a recommendation for further consideration included a list of other sources of data in order to calculate air emissions for restaurants. The strategy is also listed in Appendix 4.

VIII. References

1. "Developing Air Emission Control Strategies: A Collaborative Effort." Reducing Air Pollution Together, New Jersey Department of Environmental Protection. July 19, 2005. http://www.nj.gov/dep/airworkgroups/index.html (10 August 2005).
2. "Homes and Restaurants." Workgroup Presentations, Reducing Air Pollution Together, New Jersey Department of Environmental Protection. June 29, 2005. http://www.nj.gov/dep/airworkgroups/docs/home_restaurant_presentation.pdf (10 August 2005).
3. Roe, S. M. and Lindquist, H. C. "Final Report: MANE-VU Residential Wood Combustion Emission Inventory." Prepared for Mid-Atlantic Regional Air Management Association by E.H. Pechan & Associates, Inc. June 22, 2004.
4. "8-Hour Ozone." Workshop Presentations, Reducing Air Pollution Together, New Jersey Department of Environmental Protection. June 29, 2005. http://www.nj.gov/dep/airworkgroups/docs/ozone_sip_presentation.pdf (10 August 2005).
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6. "Homes and Restaurants Workgroup." Reducing Air Pollution Together, New Jersey Department of Environmental Protection. August 10, 2005. http://www.nj.gov/dep/airworkgroups/home_restaurant_workgroup.html (10 August 2005).
7. Hanna, P. (peg.hanna@dep.state.nj.us) (15 August 2005). Re: Fwd: Fry-O-Diesel Blends. Personal email to C. Schell (christine.schell@dep.state.nj.us).

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 1a: Summary of Workgroup Meetings: Meeting Minutes from June 29, 2005

October 31, 2005

SUMMARY

Prepared by: Laura Scatena
On Wednesday, July 06, 2005
Revised: July 14, 2005

Homes and Restaurants Workgroup Meeting

Held: June 29, 2005
Meeting Location/Address: The War Memorial, Trenton, NJ
Meeting called by: Ray Papalski
Co-Facilitators: Sandra Cohen, Laura Scatena

Attendees:

State Team Members:

1. Ray Papalski, Workgroup Leader, New Jersey Department of Environmental Protection (NJDEP), Division of Air Quality Planning (DAQ), Bureau of Air Quality Planning (BAQP)
2. Sandra Cohen, Co-Facilitator, NJDEP DAQ BAQP
3. Laura Scatena, Co-Facilitator, NJDEP DAQ BAQP
4. Frank Matula, NJDEP, DAQ, Bureau of Technical Services
5. Jim Scarvalli, NJDEP, Division of Compliance and Enforcement (DCE), Minor Source Compliance Investigation
6. Tom Pitcherello, New Jersey Department of Community Affairs (NJDCA)

Participants:

1. Mohammad Ali, New Jersey Department of Agriculture (NJDOA)
2. Adeline Arnold, Aberdeen Township Environmental and Shade Tree Advisory Board
3. Stephen Atzert, U.S. Fish and Wildlife Service, E.B. Forsythe National Wildlife Refuge
4. Eric DeGesero, Fuel Merchants Association of New Jersey
5. Amy Frank, NJDCA
6. Anne Leimback, Mid-Atlantic Hearth, Patio & Barbecue Association (HPBA)
7. Gabriella Munoz, NY Academy of Sciences
8. Vince Patram, Specialty Chemical Catalysts Engelhard Corporation
9. Dawn Prandi, Somerset County Health Department
10. Kety Rosario, NJDEP DCE
11. Arnold Schmidt, Union County Health Department
12. Tina Walling, Aberdeen Township Environmental and Shade Tree Advisory Board

Materials:

1. Workgroup Presentation, June 29, 2005, pdf file available at **http://www.state.nj.us/dep/airworkgroups/**
2. List of Applicable Websites
3. United States Environmental Protection Agency (USEPA) Wood Stove Change-Out Campaign, **http://www.epa.gov/woodstoves/changeout.html**
4. USEPA **http://www.epa.gov/woodstoves/partner.html**

Introduction/Announcements

- Since this was the first meeting, the participants introduced themselves and explained their expectations for the workgroup. Expectations included: 1) linking this category of emissions to construction code issues; 2) addressing increased wood smoke during winter months due to increased home-heating fuel costs; 3) enforcement of emissions from restaurants under N.J.A.C. 7:27-5; 4) enforcement/authority for addressing neighborhood complaints about woodsmoke from residential fireplace/firepits (i.e. is this a health department issue?); 5) promoting wood stove replacement/exchange programs; 6) Addressing Class I Airshed impacts from open burning/forest fire management; 7) addressing the sulfur/fuel issue (e.g. regional efforts vs. NJ-specific home heating efforts); 8) Addressing any agricultural concerns (e.g. emissions from open burning, diesel-powered equipment, non-road equipment); 9) addressing public health impacts (i.e. restaurant emissions as well as links between diesel emissions and increased/exacerbated asthma and other respiratory effects); and 10) technology for particulate matter removal.
- No other announcements.

Overview

- The workgroup purpose and goals were discussed.
- The logistics of how the workgroup would function was explained. The workgroup will continue to meet over the next several months with final recommendations by the workgroup due back to the NJDEP by September 30, 2005.
- The workgroup members decided to stay together as a plenary group to address all issues rather than split into different subgroups.

Discussion

Topic 1: Representation missing in the workgroup

Discussion:

- A concern was raised that certain groups that should be participating in the workgroup were not present, particularly with respect to restaurant emissions. The following groups were cited:
  (1) Department of Health *(Note by Laura Scatena - not mentioned in the meeting: Jim Blando from the Department of Health was contacted but was not able to attend this meeting due to a conflict. He intends to participate on future workgroup discussions. He also solicited participation within his Department).*
  (2) New Jersey Environmental Health Association (NJEHA)
  (3) Builders/Construction companies and related Trade Associations
  (4) Restaurant companies and related Trade Associations

Conclusion: It was decided that NJDEP staff would reach out to certain people/groups again to solicit their participation now that the work of the group is better defined. Workgroup members were also encouraged to reach out to representatives of the building/construction communities to solicit their participation, as there is a strong possibility that they will be impacted by the outcome of this workgroup.

Action Items/Person(s) responsible/Deadline:

- Laura Scatena – contact New Jersey Restaurant Association (Deborah Dowdell)
- Ray Papalski – contact major fast food chains
- Sandra Cohen - contact builder representative(s)

Topic 2: Source of restaurant emissions

Discussion:

- The source of restaurant emissions was explained as the resulting smoke from the burning of meat and food.
- A point was made that “anything can be retrofit” and the ability and technology to custom-make technologies for any equipment is currently available.
- An overview of California regulations was mentioned and one participant mentioned that new restaurant sources other than Chain Driven Charbroilers might be proposed for controls within the next year.

Conclusion: No conclusion at this time. Topic for future agenda/meeting.

Action Items/Person(s) responsible/Deadline: None

Topic 3: Authority on firepits and chimeneas

Discussion:

- Who has authority under Subchapter 5 (The Control and Prohibition of Air Pollution) to regulate emissions from commercial and residential entities? Since Subchapter 5 applies to commercial properties but not to residential properties, options were discussed for how to address complaints about odors/excess smoke from the use of fireplaces, woodstoves, firepits and chimeneas in residential areas. It was suggested that health departments currently have the authority to investigate a residential complaint about woodsmoke and determine if appropriate materials are being burned (e.g. untreated firewood rather than household or commercial waste material). Suggestions for additional authority included local or county health departments, police departments, municipal ordinances, state regulations (i.e. restrictions or bans on types of periods of burning or equipment), education and outreach to change behavior and financial incentives.

Conclusion: No conclusion at this time. Topic for future agenda/meeting.

Action Items/Person(s) responsible/Deadline: None

Topic 4: Firepits vs. open burning vs. prescribed burning

Discussion:

- The issue of how firepits (outdoor burning) are related to the regulation of open burning and prescribed fires was discussed. Current regulations and authority for open burning and prescribed burning were outlined. Subchapter 2 prohibits residential open burning of any kind. The only legal method of open burning is under permits issued to Parks and Forestry for prescribed burning and permits issued to Department of Agriculture for specific types of open burning (e.g. crop reduction).
- Existing control measures already apply to prescribed burning/open burning by permit, including prohibition on burning during high ozone days and required removal of all saleable materials prior to burning.
- Existing regional efforts were also mentioned including NESCAUM study of emissions from outdoor wood-burning boilers for home heating.
- This led to a discussion of possible additional control measures:
  (1) Expand existing restrictions on prescribed burning/open burning permits to include additional emission reduction measures
  (2) Better define and distinguish burning for home heating (e.g., wood stove/fireplace) vs. ornamental burning (e.g., chimeneas) vs. Subchapter 2 burning (e.g., burning by permit)
  (3) NJDEP to recommend wood types and home heating fuel sources that burn “clean” (e.g., public education).

Conclusion: No conclusion at this time. Topic for future agenda/meeting.

Action Items/Person(s) responsible/Deadline: None

Topic 5: Wood stoves and fireplaces

Discussion:

- Existing controls on wood stoves and fireplaces, including 1988 USEPA regulations requiring higher-efficiency (60-80% less polluting) wood stoves in all new construction.
- Pilot wood stove/fireplace change-out programs by the USEPA partnering with various organizations such as the HPBA. Anne Leimback, representing the Mid-Atlantic Hearth, Patio & Barbecue Association (HPBA), discussed a specific pilot project in Pittsburgh, PA. USEPA is providing $100,000 for the entire program, including discount of new stoves, destruction of old stoves and education and outreach efforts involving 60-100 homes in this one municipality.
- The cost and efficiency factors between retrofits (e.g., putting a catalytic converter, new technology, on a wood stove) or a change-out program were discussed and appeared to both be around $1000 per unit, but costs would likely become reduced for either approach over time due to efficiencies of scale.
- There was concern that NJDCA and NJDEP currently have no authority for regulating this area and that local authority (e.g., inspections) would not be effective in regulating wood stoves and fireplaces in new construction. However suggestions were made for phasing out existing woodstoves and fireplaces if sufficient authority could be substantiated including: 1) sale of home triggers inspection and change-out to new EPA standard woodstove; would requires replacement, retrofit or disconnection of any stoves not meeting the 1988 requirements. Could this be done under municipal ordinance and, if so, does the political will exist?
- Other suggestions to be considered for recommended control measures included: 1) apply seasonal/weather-related and/or air-quality related restrictions to operation of woodstoves and fireplaces (e.g. restricted fireplace burning days in Vermont). Precedent already exists in restrictions on campfires during high-fire risk days and restrictions on lawn watering during severe drought emergencies; 2) Statewide education and outreach campaign regarding the health benefits of compliance and/or participation, operation and maintenance to reduce emissions from residential woodburning, including promotion of improved indoor air quality; 3) outlawing all residential woodburning in new construction. Concerns were expressed that this last suggestion was not feasible but others offered that while there is no existing authority for a policy prescribing the type of fuel used to heat a home, operational standards could be applied by DCA if based on authority from another Department (e.g. BPU ban on electric home heating based on energy conservation concerns).

Conclusion: No conclusion at this time. Topic for future agenda/meeting.

Action Items/Person(s) responsible/Deadline: None

Wrap-up

- Recommendations (potential, for further discussion):
  (1) Seasonal restrictions
  (2) Education and Outreach Campaign
  (3) Relate control measures to improved air quality benefits
  (4) Prohibiting wood burning in new construction (the concern of authority of implementation will be discussed in the future)
- Future agenda items were discussed for the meetings that will take place throughout the summer. There will be four more meetings (*topics subject to change as agreed upon by the group)*:
  (1) Woodburning inside the home (e.g. wood stove change-out vs. retrofit vs. new construction restrictions
  (2) Woodburning outside the home (e.g. residential open burning vs. firepits/chimeneas)
  (3) Restaurants and Other Sources (e.g. sulfur in fuels)
  (4) Wrap-up and review summaries and develop into formal recommendations to be submitted to NJDEP.
- Future meeting logistics were discussed. Various venues were discussed such as online, in-person, or a conference call. The final decision was to hold a meeting at the DEP in Trenton, NJ in a room with conference call capability.
- All information will be posted on the Homes and Restaurants Workgroup website at http://www.state.nj.us/dep/airworkgroups/home_restaurant_workgroup.html

The Next HR Workgroup Meeting is Wednesday, July 13, 10 AM at NJDEP in Trenton. Room location and conference call logistics will be provided on the HR website (see calendar links) and in the meeting agenda.

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 1b: Summary of Workgroup Meetings: Meeting Minutes from July 13, 2005

October 31, 2005

SUMMARY

Monday, July 25, 2005
Revised: July 28, 2005
Revised: August 9, 2005

Homes and Restaurants Workgroup Meeting

Held: July 13, 2005
Meeting Location/Address:
NJDEP Headquarters Building, 401 E. State St., Trenton, NJ
Meeting called by: Ray Papalski
Co-Facilitators: Sandra Cohen, Laura Scatena

Attendees:

State Team Members:

1. Ray Papalski, Workgroup Leader, New Jersey Department of Environmental Protection (NJDEP), Division of Air Quality Planning (DAQ), Bureau of Air Quality Planning (BAQP)
2. Sandra Cohen, Co-Facilitator, NJDEP DAQ BAQP
3. Laura Scatena, Co-Facilitator, NJDEP DAQ BAQP
4. Frank Matula, NJDEP, DAQ, Bureau of Technical Services
5. Jim Scarvalli, NJDEP, Division of Compliance and Enforcement (DCE), Minor Source Compliance Investigation
6. Tom Pitcherello, New Jersey Department of Community Affairs (NJDCA)

Participants:

1. Adeline Arnold, Aberdeen Township Environmental and Shade Tree Advisory Board (by phone)
2. Laurence Bernson, R&D Council of NJ
3. Kenneth Fradkin, USEPA Region 2 (by phone)
4. Amy Frank, NJDCA
5. Anne Leimbach, Mid-Atlantic Hearth, Patio & Barbecue Association (HPBA) (by phone)
6. Gabriella Munoz, NY Academy of Sciences (by phone)
7. Vince Patram, Specialty Chemical Catalysts Engelhard Corporation
8. Dawn Prandi, Somerset County Health Department (by phone)
9. Kety Rosario, NJDEP DCE
10. Arnold Schmidt, Union County Health Department
11. Rich Vaccaro, Madison-Vector
12. Tina Walling, Aberdeen Township Environmental and Shade Tree Advisory Board (by phone)
13. Jerry Woodward, Hearth and Home Technologies (by phone)

Materials:

1. Name tag *(Please bring to the next meeting)*
2. Attendance sign-in sheet
3. Last meeting summary (6-29-05), pdf file available at http://www.nj.gov/dep/airworkgroups/home_restaurant_workgroup.html
4. Agenda, pdf file available at http://www.nj.gov/dep/airworkgroups/home_restaurant_workgroup.html
5. USEPA standards: New residential wood heaters, http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=c59f307b39a9d33d324266d576e01864&rgn=div6&view=text&node=40:6.0.1.1.1.63&idno=40

Introduction/Announcements

- Since the meeting also incorporated a conference call for those who could not be in Trenton, all participants introduced themselves.
- There were a couple of announcements regarding the workgroup webpage. Updates for the meeting time, minutes, and agenda had not been posted in time for the meeting. It was explained that the NJDEP would work diligently to see that the process for updates becomes quicker. Since computer technology would primarily be used for communication, it was suggested to the participants that they check the website regularly for updates, especially the day before a meeting.
- The participants were asked if the NJDEP could post the workgroup participants on the webpage and the workgroup unanimously agreed that it would be okay to list the affiliations only of the participants on the webpage.
- It was also requested that the contact information for all the participants be emailed to everyone in the group. *(Emailed July 14, 2005)*

Overview

- No one provided additions/corrections on the minutes of the previous meeting or on the current agenda.
- The outreach assignments from the previous meeting were completed but it was decided that more outreach needed to be done since the workgroup still lacks representation from the Department of Health and homebuilders/construction companies and related trade associations. The topic of reducing emissions from indoor woodburning from wood stoves and fireplaces was introduced as the main discussion focus of this meeting.

Discussion:

Reducing emissions from indoor woodburning (i.e., wood stoves and fireplaces)

Topic 1: Current USEPA standards (Subpart AAA - Standards for Performance of New Residential Wood Heaters)

Discussion:

- The existing federal (USEPA) standards were discussed at length as a possible control strategy for indoor woodburning. Several key points were made during the discussion:
  1) While the federal standards require the subject appliances to achieve a certain level of combustion efficiency to minimize emissions, the performance standards apply only to new or replacement controlled combustion appliances (e.g. wood stoves); they do not apply to fireplaces, existing wood stoves or other indoor woodburning appliances expressly exempted in the standards. The Hearth Industry is already required to comply with the USEPA standards but fireplaces are not. Fireplace inserts are certified by the USEPA and meet the same standards as wood stoves.
  2) There was confusion over the difference between fireplaces and wood stoves (see Topic 2 below) that needs to be addressed in order to develop effective control strategies (see recommendations below).
- Suggestions:
  1) All licensed contractors and manufacturers should be trained to comply with the current standards. DCA does not currently require a licensed contractor for installing a wood stove; however, as of January 2006, all Home Improvement Contractors operating in New Jersey will be required to register with DCA. The registration process could be used to educate this group about compliance with the federal standards.
  2) It was suggested that a more direct and effective approach to implement the federal standards for all new construction would be for DCA to include them in their code requirements. However, the requirements would only apply to new and replacements of controlled combustion appliances, which may require local permits.
- After deciding that the USEPA standards should be implemented in the DCA code, the stringency of the standards was discussed. It was determined that the standards are set and not much else could be done to change the federal standards at the moment. However, Washington and Colorado have adopted state standards and these should be investigated.
- It was stated that the National Fireplace Institute (NFI) has a training program for proper installation and operation of new and existing fireplaces.
- The data for the number of existing woodburning units sold in New Jersey was requested but it was agreed that this data would not be useful in developing effective control measure(s).

Conclusion:

- Recommendation: DCA should revise the Uniform Construction Code to cross-reference the current federal

standards and require compliance for all new and replacement wood stoves (except those exempted in the standards) and fireplace inserts. Under this recommended control strategy, all dealers would be required to sell USEPA-compliant units and the federal performance standard would be enforceable by DCA statewide. The requirements would address only new and replacement controlled combustion units, which require local permits.

- Washington and Colorado standards should be investigated further.

Action Items/Person(s) responsible/Deadline:

1. What is the USEPA efficiency standard?
   - Assigned to: Ray (completed)
   - *The USEPA standards for wood stoves (and fireplace inserts) are 7.5 grams of smoke per hour for non-catalytic stoves and 4.1 grams of smoke per hour for catalytic stoves.*
2. Training requirements for fireplace installation and replacement
   - Assigned to: Anne, HPBA

Topic 2: Woodburning efficiency: Differences between residential woodburning appliances

Discussion:

- Since the existing federal standards apply only to "controlled combustion appliances", the differences between wood burning stoves and fireplaces were discussed at length. The differences discussed fell into 3 categories:
  - Fuel type
  - Free standing vs. installed
  - Efficiency (i.e. emissions)
- These differences were expanded upon as follows: Not all controlled combustion appliances burn traditional firewood (e.g. logs and tinder). Some are designed to use compressed wood pellets. Fireplaces are installed into the infrastructure of the house whereas woodburning stoves can be freestanding. Woodburning stoves generally burn more efficiently than fireplaces.
- It was suggested that an effective control strategy would need to define the regulated appliance(s) in terms of 'site-built' or 'manufactured' and whether the emissions would be affected.
  - Currently, new residential construction for installing fireplace inserts or woodburning stoves must comply with the federal performance standards.
  - Open masonry fireplaces constructed on site are specifically exempted.
  - Factory built fireplaces though not technically exempt are not wood heaters as defined in the regulation (i.e. air-to-fuel ratios much higher than 35-to-1, high burn rates, etc).
  - Fireplace inserts are essentially wood heaters that have been adapted to fit into fireplaces. The USEPA regulates the inserts as wood heaters and certifies these units. The following link provides some additional clarification (http://www.epa.gov/woodstoves/fireplaces.html).
  - Fireplaces are outside the scope of the USEPA rules. It was suggested that inserts be required so that fireplaces comply with the USEPA rules.

This section above required further clarification through email communication and reflects revisions made by the workgroup members.

- The question of regulating antique stoves was raised and it was stated that antique stoves are illegal to sell at a dealership level. Person-to-person sales of antique stoves were thought not to be a significant issue within the State.
- Questions were raised about promoting woodstoves over fireplaces. A Canadian study was cited that evaluated dioxin emissions comparing conventional and certified stoves. It showed that dioxins are higher in certified stoves even though other pollutants are lower compared to conventional stoves. The study found that gas-burning stoves resulted in the lowest emissions. The general response from the group was to focus the recommendations on the reduction of particulate emissions and not other toxics or hazards at this time, although the concern would be mentioned in the report.
- Options for switching from a woodburning unit to a gas-fueled unit were debated. Rough figures from industry were as follows:
  - Total cost to switch is about $1500 minimum
  - Cost depends on efficiency
    - Gas logs: 10% heat efficiency ($1500)
    - Vent-free: 100% heat efficiency
    - Insert and blower: 80-85% heat efficiency

- Conclusion: It was decided by the group to wait for the USEPA to propose new standards for fireplaces and existing appliances since DCA does not have the authority to enforce construction codes that are not based on state or federally-promulgated standards. Washington State and Colorado standards for fireplaces and their certification should be investigated.
- Potential Recommendation: New Construction - Fireplaces & Existing Wood Stoves/Fireplaces: (1) Adopt USEPA rules under NJDEP then adopt into DCA code.
- Recommendation: New Construction - Fireplaces & Existing Wood Stoves/Fireplaces: (2) Restriction on wood burning sources: Ban and/or require inserts/fireplaces with specific efficiency
  - Depending on: #/type of new units and #/type of appliance/fuel source
  - Industry opposes: no significant environmental benefit; diminishing return

Action Items/Person(s) responsible/Deadline:
1. Fireplaces: Shift from woodburning to gas fireplace – can we get numbers (trends)? Jerry
2. Fireplaces: Options and costs for improving efficiency of existing units Jerry
3. New wood stoves: Future development restriction based upon a certain number of units (fuel type, construction; e.g., more than 5 or 10 home construction units must install gas fireplaces) Anne, HPBA

Topic 3: Neighbor issues/complaints

Discussion:
- Federal regulations do not address stack height or distance from one home to the next in relation to the location of a fireplace.
- Subchapter 5 is the state regulation that addresses general air pollution complaints.
- # of units and distance between homes: there are local codes for this, as well as DCA codes, but they are for fire prevention and safety, not for the control of particulates.
- Local health code vs. statewide uniform code for municipalities
- Nuisance codes: who enforces?
- Concerned that we're not controlling a perceived nuisance in the workgroup
- Members wanted to keep focus on the PM problem and decided that someone needs to address the issue

Conclusion: The work group agreed by consensus to expand their "mission" to also address localized "neighbor-to-neighbor" health and aesthetic-related air quality issues from residential woodburning. Topic for future agenda/meeting.

Action Items/Person(s) responsible/Deadline: None

Topic 4: Wood pellet stoves

Discussion:
- More efficient than USEPA-approved wood stoves; less polluting; cheaper than propane and natural gas
- Current federal energy bill (House) includes rebate program for pellet stoves
- Burns compressed wood by-products
- More common in northern and southern NJ
- Renewable energy resource
- MD and DE: large sales ($150/ton; about 3 tons/season in NJ)
- There are current standards for clean wood content within the "pellets"

Conclusion: Since not everyone was familiar with wood pellet stoves, it was decided that information about them needed to be obtained and shared with the group.

Action Items/Person(s) responsible/Deadline:
1. Wood-pellet stoves info
   - Assigned to: NJDEP

Topic 5: Existing wood stoves/fireplaces

Discussion:
- Change-out program (with USEPA or a regional planning organization?) to replace existing woodstoves and fireplace inserts.
- There were many options discussed about how a change-out program could be done. This was discussed in great detail at the last meeting as well. The recommendations, as listed below, would need more research

but the consensus of the group was to recommend a state or regional woodstove and fireplace insert change-out program.
- Infrastructure and/or service needs to be available in a given area in order to successfully complete a change-out program. It was suggested that the utility companies (e.g. PSE&G) be contacted to assess their interest in participating or funding a change-out program to convert from woodburning appliances to natural gas.

Websites for more information
- www.epa.gov/woodstoves, links to HPBA site on change-outs.
- Pellet Fuel Institute (PFI) website

Conclusion:
Potential Recommendation: Existing Fireplaces & Existing Wood Stoves: (4) Investigate a potential tax rebate and/or industry discount for higher efficiency unit and/or USEPA-sponsored exchange program and/or utility company rebate

Action Items/Person(s) Responsible/Deadline:
1. NJDEP to approach USEPA regarding making NJ the (or part of the) next focus of change-out pilot program
   - What would NJ have to do?
   - What would scope of the program be?
     - Assigned to: Ray/Anne
2. Additional websites to review - areas that currently change-out units in real estate before the transaction is made
     - Assigned to: NJDEP
3. Reach out to BPU/utility companies regarding rebate program
     - Information on HPBA website/Hearth and Home website (not assigned – will be posted on the web)
4. Overlay non-attainment areas w/ utility franchise areas to focus incentive programs (high PM and available gas lines)
     - Assigned to: Ray *(Ray contacted BPU for the information to be mapped.)*

Topic 6: General Brainstorming/Additional strategies

Discussion:
- The group was reminded of the ground rules and that all ideas would be considered. Therefore, the group was asked to not exclude an idea right away and to think of any other ideas that the group could consider for reducing emissions from indoor woodburning.
- The following ideas were suggested and discussed:

  New Wood Stoves
  - Decrease non-retail sale of units (individual to individual); quantify qualitatively by looking at the classified ads – the group decided that this practice was an insignificant source of emissions and the potential benefit was not worth the cost (i.e. tremendous work effort) that would be required to track the transactions.

  Existing and New Wood Stoves/Fireplaces
  - Require that an existing wood stove/fireplace be changed to a certified unit before the sale of the home. *(see action item under discussion for change-out programs)*

  Fireplaces
  - Education and outreach
    - Brochures to handout with a retail or home purchase on the benefits of changing to an USEPA-certified wood stove or fireplace insert
    - Should explain the benefits of certified units
    - Should include outreach to developers and realtors

There was a lot of overlap between new and existing wood stoves and fireplaces when discussing additional strategies. Some topics may also be covered under other topics.

Conclusion: The following ideas will be considered and researched. A final screening of ideas will be done at the last meeting.
- Potential Recommendation: New Construction - Fireplaces & Existing Wood Stoves/Fireplaces: (3) Education and Outreach to promote better alternatives
  - Health and environmental impacts
- Potential Recommendation: New Construction - Fireplaces & Existing Wood Stoves/Fireplaces: (5) Require

replacement of older fireplaces upon sale of residential (commercial) property (i.e., lead)

Action Items/Person(s) responsible/Deadline:

1. USEPA and institute literature on benefits of cleaner burning alternatives
   - Assigned to: NJDEP
2. Education and outreach: From whom? To whom? What is the message?

Wrap-up

- The recommendations (see conclusions in the discussion) were summarized with the group.
- Homework assignments were assigned to clarify any issues discussed in the meeting (see action items in the discussion).
- Future agenda items were discussed for the next meeting on outdoor wood burning:
  (1) Residential open burning
  (2) Fire pits/chimeneas
  (3) Prescribed burning
  (4) Burning by permit
- Future meeting logistics were discussed. It was decided to continue to meet every 2 weeks on Wednesdays at the same time and place (NJDEP Headquarters Building) with the option of the conference call phone-in.
- All information will be posted on the Homes and Restaurants Workgroup website at http://www.state.nj.us/dep/airworkgroups/home_restaurant_workgroup.html

The Next HR Workgroup Meeting is Wednesday, July 27, 10 AM at NJDEP in Trenton. Room location and conference call logistics will be provided on the HR website (see calendar links) and in the meeting agenda.

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 1c: Summary of Workgroup Meetings: Meeting Minutes from July 27, 2005

October 31, 2005

SUMMARY

Monday, August 15, 2005

Homes and Restaurants Workgroup Meeting

Held: July 27, 2005
Meeting Location/Address:
NJDEP Headquarters Building, 401 E. State St., Trenton, NJ
Meeting called by: Ray Papalski
Co-Facilitators: Sandra Cohen, Laura Scatena

Attendees:

State Team Members:

1. Ray Papalski, Workgroup Leader, New Jersey Department of Environmental Protection (NJDEP), Division of Air Quality Planning (DAQ), Bureau of Air Quality Planning (BAQP)
2. Sandra Cohen, Co-Facilitator, NJDEP DAQ BAQP
3. Laura Scatena, Co-Facilitator, NJDEP DAQ BAQP
4. Frank Matula, NJDEP, DAQ, Bureau of Technical Services

Participants:

1. Mohammad Ali, New Jersey Department of Agriculture (DOA)
2. Adeline Arnold, Aberdeen Township Environmental and Shade Tree Advisory Board (by phone)
3. Kenneth Fradkin, USEPA Region 2 (by phone)
4. Anne Leimbach, Mid-Atlantic Hearth, Patio & Barbecue Association (HPBA) (by phone)
5. Gabriella Munoz, NY Academy of Sciences (by phone)
6. Deborah Pinto, NJDEP
7. Dawn Prandi, Somerset County Health Department
8. Kety Rosario, NJDEP DCE
9. Arnold Schmidt, Union County Health Department
10. Chris Shaffery, White Castle
11. Rich Vaccaro, Madison-Vector
12. Jerry Woodward, Hearth and Home Technologies (by phone)

Materials:

1. Name tag *(Please bring to the next meeting)*
2. Attendance sign-in sheet
3. Last meeting summary (7-13-05), pdf file available at http://www.nj.gov/dep/airworkgroups/home_restaurant_workgroup.html
4. Agenda, pdf file available at http://www.nj.gov/dep/airworkgroups/home_restaurant_workgroup.html
5. New Jersey's Air Pollution Control Act (26:2C-22.Relation of local ordinances or regulations to State law), full version at http://www.nj.gov/dep/enforcement/apca.html

Introduction/Announcements

- Since the meeting also incorporated a conference call for those who could not be in Trenton, all participants introduced themselves.

Overview

- No one provided additions/corrections on the minutes of the previous meeting or on the current agenda.
- Assignment status: This will be discussed at the Wrap-up meeting (the last meeting on Sept. 14)

Discussion:

Outdoor Wood Burning Practices

Topic 1: Neighbor – to – Neighbor Complaints

- Jurisdictional Issues – Whom Enforces?
- Regulatory Issues – When and How Enforced?

Discussion:

- Previous discussions from past meetings regarding residential complaints led to potential solutions such as creating local ordinances. The issues regarding enforcement and new regulations were discussed.
- The New Jersey Air Pollution Control Act was reviewed to see if potential local ordinances could be passed. It was explained that municipalities are preempted from passing new ordinances for air pollution control and that there is a pre-1995 grandfather clause to which 2 ordinances apply.
- The majority of the complaints are referred to County Health Departments who are authorized by the NJDEP to enforce state air quality statutes and regulations, as in the Air Pollution Control Act. The majority of the complaints are for emissions from commercial sources and not from residential wood burning.
- The current options for resolving neighbor-to-neighbor complaints that were outlined include changing the current legislation, which would require legislative and governor support and potentially lead to more changes that were unsolicited, or civil litigation between the neighbors (no health or environmental agency involved).
- Local health departments under the health codes may have the authority to enforce nuisance complaints.
- It was suggested that the state or local health departments be given the authority to require a homeowner to fix or upgrade their wood stove, fireplace insert, or fireplace to resolve a neighbor-to-neighbor complaint.

Conclusion: The discussion resulted in 4 main recommendations:

1. Health departments notify NJDEP regarding complaints and NJDEP will track and evaluate data. The data will be used to support local action under nuisance codes.
2. Expand Subchapter 5 to address residential emissions of $PM_{2.5}$ and include retrofit requirements in Subchapter 4 (?).
3. Implement an all health department/all NJDEP hotline.
4. Amend the New Jersey Air Pollution Control Act to allow for local bans on outdoor wood burning at the municipal level and to provide the authority to require homeowners to upgrade their wood stove or fireplace to resolve an odor complaint.

Action Items/Person(s) responsible/Deadline: None

Topic 2: Public Education:

- Banning Wood Burning on Days of Forecast High Ozone / Particle Days
- At Time of Purchase (e.g.; brochures, instructions)
- Other?

Discussion:

- The following suggestion was made at a previous meeting:
  - Seasonal/air quality-related bans on wood burning on high ozone/unhealthful air quality days (akin to ban/restriction on lawn watering during a drought emergency)
  - Enforcement:
    - Ozone Action Alerts
    - Press releases
    - Education and Outreach
    - Non-regulatory approach?
    - General advisory: Education and Outreach pamphlets with manufacturer/sellers at time of sale – possibly distribute through ANJEC
  - Non-traditional approaches:
    - Avenues and partners: Daycare centers, schools (PTA/PTO), hospitals, community centers, Scouts, restaurants, ANJEC
    - (Local Information Network & Communications System) LINCS: County advisories to the above

partners (Department of Health network) could be used to notify people of unhealthful air quality.
    - Use LINCS epidemiologist to evaluate and correlate data on air quality to wood burning complaints with adverse health impacts.
    - NJDEP data correlating hospital admissions (asthma) to poor air quality days (use as the basis for local/county health department action)
    - Flashing signs on roadways: Add messages discouraging open burning, health impacts and reduced activity on high ozone days

- A concern was raised in regards to announcing restrictions on wood burning appliances in that the announcements could be promoting or marketing the appliances.

Conclusion: The discussion resulted in the following recommendations:
1. Education and Outreach: Non-traditional avenues and partners should be investigated (see discussion notes).
2. Education to towns about these appliances to see if they are covered by existing zoning regulations (see Topic 4)
3. Require an overall standard (see Topic 3) and promote a daily advisory

Action Items/Person(s) responsible/Deadline: None

Topic 3: Chimeneas, Fire Pits, Outdoor Wood Boilers (All outdoor wood burning appliances)

Discussion:
- In general, outdoor wood burning units were recognized as a cumulative problem and suggestions for controlling emissions on all units were discussed.
- Require equipment standards, such as New Source Performance Standards, for outdoor units.
- Potential solutions for this type of equipment included a discussion on federal regulation. It was unknown if the EPA would be addressing standards for outdoor equipment similar to the new source performance standards for wood heaters and fireplace inserts.
- Local authority and enforcement was raised as a potential solution: Engage ANJEC (model ordinance), NJDEP, DHS, and the local health and fire departments.
- Public education (see Topic 2)

Conclusion: The discussion resulted in the following recommendations but more investigation is needed to determine a federal approach:
1. State approach: Local zoning ordinance that bans or requires permits for outdoor wood burning in certain densities/types of development
2. Regulate fuel source (such as Paraffin vs. wood or natural gas vs. wood)
3. Non-regulatory Education and Outreach: (see Topic 2)
4. Equipment standard and daily advisory (see Topic 2)

Action Items/Person(s) responsible/Deadline:
- Potential additional types of wood burning units to be addressed under new federal regulations – Ray

Topic 4: Outdoor Wood Boilers (OWBs)

Discussion:
- Outdoor wood boilers were discussed separately because the emissions and technology is not clearly understood but they are becoming an increasing air problem in the Northeast.
- The same options were presented for OWBs as were presented for all outdoor wood burning appliances.
    - Potential action to control emissions:
        - Ban?
        - New Source Performance Standards?
- Current action: There are currently no controls for the units but research is being conducted by NESCAUM (a regional organization) to quantify their emissions.
- Public education (see Topic 2)

Conclusion: More information needs to be gathered before making any further suggestions on these units specifically. However, two recommendations could be made:

1. Education to towns about these appliances to see if they are covered by existing zoning regulations. (parallels the public education/education and outreach program discussions under Topic 2)
- Also, see the conclusion section under Topic 3
2. Potential standards for these units should be developed by a regional agency or by the USEPA.

Action Items/Person(s) responsible/Deadline:
- Look into the NJDEP contributing money to the NESCAUM study – Ray
- Who makes OWBs? Who sells them? – Frank
- What is EPA doing? – Ken
- Are wood boilers a local health and safety issue? Fire hazard? (Zoning/health/safety issues) – Laura

Notes:

(1) Subsequent to this meeting, a petition to the USEPA administration was developed by many states, including New Jersey, asking for the USEPA to develop national standards for OWBs.

(2) Subsequent to this meeting, information was provided to NJDEP about Connecticut's approach to OWBs. Recent legislation limits the size of the property and the distance to property line upon which an OWB could be placed. This 'stopgap' legislation was passed as an interim control measure until standards could be developed for OWB emissions.

Topic 5: Subchapter 2: Control and Prohibition of Open Burning:
- NJDEP Permitting Changes
- NJDEP Regulatory Changes

Other outdoor wood burning activities

Discussion:
- Subchapter 2 was explained as it currently exists.
  - The Division of Parks and Forestry issues the permits for open burning of plant life and the Division of Air Quality Management issues permits in cases of hazardous materials and emergencies (e.g., decommission explosives on military bases)
  - Enforced by: NJDEP and CEHA agencies
- A question was raised with respect to the air emissions from the open burning category: The 2002 inventory is not representative of normal conditions because the data was skewed by a large Pine Barrens wildfire. Therefore, new emissions data should be reviewed to determine how much pollution is coming from residential burning compared to open burning.
- Open burning permits for some agricultural lands and activities are issued instead of requiring removal and recycling of the vegetative waste due to economical restrictions and tradition (how it always has been done).
- General Recommendations:
  a) Expand permit conditions to prohibit burning on high ozone/poor air quality/high temperature days.
  b) Remove items that can be commercially sold and/or recycled before open burning.
  c) Regulatory change to Subchapter 2:
    - New restrictions on issuance of open burning permits
    - Restrict issuance for all but expressly authorize activities:
      - Limit to farmers who are farmland exempt (>5 acres)
      - Specify that only not-for-profit agencies may apply for permits.
      - Limit to address severe infestation only.
  d) Regulate sources that are not regulated by Subchapter 2 like residential fire pits.

- The following sections in Subchapter 2 were discussed at length. The category was explained and summarized. Ways to improve the category as discussed are outlined below.
  i) 7:27-2.6 Prescribed burning
    - See 'General Recommendations'
  ii) 7:27-2.7 Emergencies
    - Decision: No changes needed
  iii) 7:27-2.8 Dangerous material
    - Decision: No changes needed
  iv) 7:27-2.9 Herbaceous plant life and hedgerows
    - Limit to maximize agriculture production (for defined period of time/prohibition of alternate use for specific period of time)

- Not ok for developments – limit where this provision could be used.
- No clearing of mature trees (specific diameter?) (enforcement issue)

v) 7:27-2.10 Orchard prunings and cullings
- Promote recycling, financial incentives for alternate methods
- Department of Agriculture should duplicate agricultural Best Manufacturing Practices (BMP) for reuse of material that would otherwise be burned (applicable to farming and landscaping, too)

vi) 7:27-2.11 Land clearing
- See the discussion under hedgerows (7:27-2.9) as the same restrictions for agricultural use should apply.

vii) 7:27-2.12 Special permit
- See previous discussion on limits
- Restrict by size, when, (e.g., high ozone days, etc.), fuel source
  1. Limit # of special permits or for amount of burning: issued by household, county, region/# of acres in a given time period (Permits already have limits on when they can burn)
  2. Ban open burning during the summer months except for emergency/prescribed burning (e.g., May – Sept.)

viii) 7:27-2.13 Fees
- Increase fee for permit as disincentive for burning
- Correlate the fee to the cost of analysis and processing

Conclusion: See recommendations outlined in the discussion.

Action Items/Person(s) Responsible/Deadline:
- Existing Department of Agriculture permit recommendations – Ferdows (M. Ali)
- Information on prevalence of activity, existing guidance, BMPs, SCS activity (enforcement) – Ferdows (M. Ali)

Wrap-up
- Next meeting: Restaurants and other sources
- Next steps after meetings:
  1. Draft report (NJDEP)
  2. Review report (workgroup)
     - Assignment: Add to report template: "missing data" – Laura
  3. Plenary session (NJDEP and all workgroups)
  4. NJDEP review of reports
  5. Implementation?

- All information will be posted on the Homes and Restaurants Workgroup website at http://www.state.nj.us/dep/airworkgroups/home_restaurant_workgroup.html

The Next HR Workgroup Meeting is Wednesday, August 17, 10 AM at NJDEP in Trenton. Room location and conference call logistics are provided on the HR website (see calendar links) and in the meeting agenda.

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 1d: Summary of Workgroup Meetings: Meeting Minutes from August 17, 2005

October 31, 2005

SUMMARY

Wednesday, August 31, 2005

Homes and Restaurants Workgroup Meeting

Held: August 17, 2005
Meeting Location/Address:
NJDEP Headquarters Building, 401 E. State St., Trenton, NJ
Meeting called by: Ray Papalski
Co-Facilitator: Laura Scatena

Attendees:

State Team Members:

1. Ray Papalski, Workgroup Leader, New Jersey Department of Environmental Protection (NJDEP), Division of Air Quality Planning (DAQ), Bureau of Air Quality Planning (BAQP)
2. Laura Scatena, Co-Facilitator, NJDEP DAQ BAQP
3. Frank Matula, NJDEP, DAQ, Bureau of Technical Services
4. Jim Scarvalli, NJDEP, Division of Compliance and Enforcement (DCE), Minor Source Compliance Investigation
5. Tom Pitcherello, New Jersey Department of Community Affairs (NJDCA)

Participants:

1. Mohammad Ali, New Jersey Department of Agriculture (DOA)
2. Adeline Arnold, Aberdeen Township Environmental and Shade Tree Advisory Board (by phone)
3. Ana Baptista, Association of New Jersey Environmental Commissions (ANJEC)
4. Laurence Bernson, R&D Council of New Jersey (by phone)
5. Eric DeGesero, Fuel Merchants Association of New Jersey
6. Kenneth Fradkin, United States Environmental Protection Agency (USEPA) Region 2 (by phone)
7. Ronald Jackson, New Jersey Board of Public Utilities (BPU), Office of Clean Energy
8. Kim Johnson, New Jersey BPU, Office of Clean Energy
9. Anne Leimbach, Mid-Atlantic Hearth, Patio & Barbecue Association (HPBA) (by phone)
10. Jeff Lynch, White Castle (by phone)
11. Jeff Miller, White Castle (by phone)
12. Vince Patram, Engelhard Corporation
13. Kety Rosario, NJDEP DCE
14. Arnold Schmidt, Union County Health Department
15. Tim Smith, USEPA, Office of Air Quality Planning and Standards (OAQPS) (by phone)
16. Paul Truchan, USEPA (by phone)
17. Sandra Valle, New York Academy of Sciences (by phone)
18. Ed Wengryn, New Jersey Farm Bureau
19. John Whitaker, White Castle

If you participated in this meeting and are not listed, please contact us at airworkgrouphr@dep.state.nj.us.

Materials:

1. Name tag *(Please bring to the next meeting)*
2. Agenda
3. Last meeting summary (7-27-05)
4. Subchapter 5: Prohibition of Air Pollution (includes odor provisions)

5. "Final Staff Report: Proposed New Rule 74.25, Restaurant Cooking Operations Proposed Revisions to Rule 23, Exemptions from Permit." Ventura County Air Pollution Control District
6. South Coast Air Quality Management District, Rule 1138, Control of Emissions from Restaurant Control Emissions
7. "Assessment of Emissions from a Chain-Driven Charbroiler (NEICO Model 9025, Golden West Equipment, Inc.) Using a Catalytic Control Device (Model 7-193)," Engelhard (pdf)
8. Zero Energy Homes Article
9. New Jersey's Clean Energy Program
10. New Jersey's Renewable Energy Program
11. Engelhard CHARCat™ 900, Charbroiler Catalysts Fact Sheet (hardcopy)
12. "Catalytic Method for Controlling Restaurants," Engelhard (report hardcopy)

Introduction/Announcements

- Role call (23 participants, see list above)
- Comments and revisions on the July 27, 2005 meeting can be sent to airworkgrouphr@dep.state.nj.us.

Overview

1. Review of the purpose of the workgroup effort:
   - Contribution to New Jersey's future efforts to control air pollution
   - Recommendations for reducing ozone and fine particulate matter
   - White papers are encouraged from those who wish to present an individual perspective
   - NJDEP to review recommendations
     - If strategies are utilized, they will go through the normal public and rule development process
- New Jersey needs a series of control measures to reduce current levels of air pollution. There appears to be no one strategy that alone will solve New Jersey's air pollution problems.
- Homes and Restaurants Idea Table and Report will be sent to the group for comment and review
- A rough final draft due by September 30

2. Background of the workgroup effort
- Meetings:
  - Introductory meeting at the War Memorial June 29, 2005
  - Indoor Wood Burning addressed at the July 13, 2005 meeting
  - Outdoor Wood Burning addressed at the July 27, 2005 meeting
  - **Restaurants and Other Sources to be addressed today**

Discussion: Restaurants and Other Sources

Topic 1: Restaurant Controls:

- **Existing California Standards**
- **Existing Controls on Restaurants (i.e.; odor type controls)**
- **New California Standards Expected?**
- **USEPA's Pilot Program for Restaurant Controls**

Discussion:

- California Standards: Existing
  - The discussion on restaurant controls began by introducing California's efforts on controlling air emissions from restaurants. A brief background focused on their controls of chain-driven charbroiler processes.
  - Initially, there was no response from the workgroup participants on their opinions on California standards and if they were appropriate to implement in New Jersey.
- New California Standards Expected?
  - There were questions about New Jersey's position on adopting California regulations. California regulations include exemptions for the amounts of cooking for which no controls are required. There is no definitative decision that New Jersey will or will not adopt these regulations. There was a concern regarding the science of the studies conducted for Southern California and that implementation in California was a result of overregulation in that state. The 1997 report released from the South Coast Air Quality Management District (SCAQMD) was used to support the regulations and discussed the cost-effectiveness of controls for different cooking methods. It was suggested that new data be collected

and investigated for new controls as the report is dated, in addition to looking at regional trends of cooking methods. To date, no other states have formally implemented restaurant controls outside California.

- Background on charbroiling
  - Everyone in the group was not familiar with the applicability of the regulations to the specific restaurant process known as charbroiling and a brief background of the method was explained. The method is comprised of a chain-driven device that carries the burgers on a belt over a direct flame. It was noted that Burger King uses this type of methodology and the existing regulations in California only apply to those establishments that use charbroiling.
  - White Castle does not use an open flame but steams their burgers, which produces very little product emissions compared to chain-driven operations. Since the only air emission factors developed for restaurant emissions are for charbroiling, White Castle representatives would investigate how different cooking methods are quantified and if any information on emissions from processes other than charbroilers exist (see Action Items).

- Restaurant Emissions in New Jersey
  - In order to understand the current situation in New Jersey and how to address restaurant emissions, a brief summary of the current data available was discussed.
  - New Jersey based restaurant emissions on the calculation method used in Southern California and made adjustments using the population of New Jersey.
  - Recommendation: Try to obtain better numbers for the emission inventory (see Action Items)
    - The New Jersey Restaurant Association (NJRA) was mentioned as possibly being able to provide better numbers (see Action Items).
    - If provided with a list of restaurants, Engelhard Corporation might be able to produce data that show better quantification of the emissions in New Jersey (see Action Items).
    - Other sources of better information that the NJDEP could reference and/or investigate included:
      - County health inspections: restaurants report to the Department of Health and Human Services
      - Calculations based on taxation data

- Existing Controls on Restaurants (e.g.; odor type controls placed voluntarily or involuntarily by the owner)
  - Discussion on the existing controls in New Jersey and those that are available in general encompassed New Jersey's applicable regulations, applying existing controls and new technology available to restaurants in those establishments that do not voluntarily do so, and requiring standards for maintenance and installation of control equipment after installation. Details are listed below.
  - Restaurants are not the only sources of cooking smoke. Other sources include industrial processes and caterers. The industrial processes and food processing plants are covered under another workgroup since this workgroup is focused on restaurants.
  - Applicable New Jersey permit requirements and options were briefly outlined:
    - Subchapter 5: County health departments verify complaints of odors or smoke and require that the restaurants do "something" (but do not specify a control) if Subchapter 5 complaints are recorded against an establishment.
    - Subchapter 8: Applies to companies with large smokers, process boilers. Research and Development (R&D) facilities must adhere to these requirements if the volume produced meets the limits specified (e.g., artificial smoke flavors, tomato sauce). The trigger is the size of equipment or the amount of material processed (e.g.; greater than 50 pounds an hour – see local controls below).

  - Maintenance of Control Equipment
  - As part of the discussion on existing controls, a significant factor in restaurant emissions is the maintenance required. The responsibility of maintaining the controls on the equipment can be the responsibility of the corporation or the franchise owner. For example, White Castle has its own maintenance staff and Burger King also takes responsibility for maintenance.
  - Controls are very expensive to change but companies may also receive tax benefits for adding controls. However, costs were discussed in more detail and the initial cost can be around $1000-1500/unit and the cost of maintenance thereafter is low.
  - The actual emissions from uncontrolled equipment are significantly high. The food does not produce the pollutants but the source is when the flame hits the burger and the fats emit volatile organic compounds (VOCs). The emissions are based on the quantity of lbs. Meat/restaurant/day. The

calculations could vary because of unequal cooking of the meat. Other factors that will affect the actual emissions include the length of time the restaurant is in business.

- Specific maintenance practices were discussed and included odor controls (for example, filtration systems - a wash system that circulates every night in addition to conducting a preliminary inspection and then rechecking every 3 months), controls to catch fat and grease, such as the Smog Hog™, and catalytic retrofits (flame-driven processes vs. lower operating temperatures result in different mixtures of VOCs and require different temperatures).
- Extra controls may also use additional electricity and it was suggested that future controls be investigated further as they might increase the amount of energy utilized and offset the environmental benefits (e.g., electrostatic precipitators).
- Based on documents and studies reviewed by some of the participants, there are different types of systems that will not necessarily use more electricity but some exist that will demand more electricity. There also can be natural gas savings by installing control equipment (see Action Items). There are other systems (e.g., LC System) that are low cost, low maintenance. More information about these systems was requested (see Action Items).

- Local Controls
- New Jersey regulations were discussed and Subchapter 16 may cover grease traps but does not cover (restaurant) smoke. Subchapter 8 is not likely to effect an average restaurant because the permit applicability levels for process rates or size are too high:
  - (1) Commercial fuel burning equipment that has a maximum rated heat input of 1,000,000 BTU per hour or greater to the burning chamber or (2) equipment in which the combined weight of all raw materials used exceeds 50 pounds in any one hour). *This is not a complete list of requirements for N.J.A.C 7:27-8. For complete details on the applicability of this subchapter, please visit* http://www.state.nj.us/dep/aqm/Sub8v2004-04-05.htm.
- Other permit issues were discussed surrounding possible applicability of Subchapters 6 and 16 to restaurants, which address RACT requirements. There was a feeling for the need for clarification on how restaurants could fit into these subchapters. Due to the charge of the subgroup, the primary focus is on area/non-major point sources under which restaurants are categorized.
- Subchapter 11 - Incinerators requires that certain levels must be met and it was suggested that restaurants could apply some of the requirements and strategies from this subchapter to restaurant controls (see Conclusion for recommendations).
- Certain systems are installed because of neighbor complaints. For example, Holton Pure Air System is required by the local zoning board in NY. The cost is comparable to the Smog Hog and the increase of electricity used was minimal.
- Other controls mentioned included a HEPA filter (low cost, simple option).
- Other situations that might require odor control include high population density and close proximity to the restaurants (e.g., NYC). The combination of these factors is significant when applying control equipment is considered. The number of controls added to existing equipment based on odor complaints versus those added due to zoning requirements was unknown but estimated to be largely due to odor complaints rather than zoning requirements in New Jersey.

- USEPA's Pilot Program for Restaurant Controls
  - The USEPA's pilot program will focus on 2 non-attainment areas: NYC and Philadelphia and will quantify benefits from restaurant equipment controls.

Conclusion: The following strategies/recommendations for further investigation were:

1. Further investigate regulations and controls applied in California for applicability in New Jersey taking into consideration the regional differences between New Jersey and Southern California while investigating the scientific studies used to support the standards; the economical impacts; social impacts; differences in cooking methods; and the proximity of restaurants to highly populated residential areas.
2. Further investigate New Jersey restaurant emissions to try to improve quantification methods for more accurate air emissions from restaurants based on other types of cooking methods (i.e., taxation data, restaurant data sent to the Department of Health and Human Services)
3. Adding controls for existing restaurant equipment should be investigated further taking into account the same factors as in #1, in addition to electricity demands and the potential for environmental benefit offsets.
4. Further investigate N.J.A.C. 7:27 - Subchapter 11 – Incinerators for applicability to restaurant controls.

Action Items/Person(s) responsible/Deadline:

1. Investigate how different cooking methods are quantified and if any information on emissions from processes other than charbroilers exist – White Castle Corp.
2. Types of restaurants and a list of restaurants in New Jersey – Laura Scatena to contact NJRA
3. A different set of emissions data for restaurants in New Jersey based on the list provided by NJRA – Vince Patram
4. Natural gas savings from installing control equipment – Vince Patram
5. Information on low cost, low maintenance systems, such as the LC Systems – Jeff Miller

Notes:

(1) Subsequent to this meeting, White Castle provided a fact sheet produced by the NJRA. The data will be included in the workgroup's idea table and report.

Topic 2: Low Sulfur Home Heating Oil

Discussion:

- There is an existing proposal by the Northeast States for Coordinated Air Use Management (NESCAUM) regional organization to reduce the sulfur content of fuel oil to 500 ppm for the northeast states. The Memorandum of Understanding (MOU) was discussed with industry at a meeting that took place in Boston, MA. A report is expected to be released soon that covers the costs and supply/distribution issues, among others, but the date for release is yet to be determined.
- The Fuel Merchants Association (distributors) was represented at the meeting and expanded upon the general position of distributors and refineries at the meeting. A concern that Pennsylvania would not be included in the MOU was expressed but since the NESCAUM states are also a part of the Mid-Atlantic/Northeast Visibility Union (MANE-VU), Pennsylvania could be included if the MOU is brought to the MANE-VU organization of states. Distributors support a NESCAUM-type approach but felt that the implementation date of 2007/08 is too aggressive because the general lead time to meet a new standard is around 6 years. The current demands and standards were reviewed with distribution issues explained.
- From the refineries' position, the $PM_{2.5}$ annual emissions do not reflect a spike during peak periods of oil usage, thus inferring that there is no problem and that the proposal is not needed. In addition, other efforts to reduce sulfur in fuels are already in place: in mobile sources, sulfur will be reduced beginning in September 2006 and will steadily decrease until 2010, and will include marine sources.

Conclusion: The group concluded the following strategy for New Jersey:

1. Work with NESCAUM to develop an MOU for a regional sulfur in fuel oil standard that addresses capacity, supply, distribution, and timing concerns of the refineries.

Action Items/Person(s) responsible/Deadline: None

Topic 3: Renewable Energy and Energy Efficiency Programs Rebates for Homeowners and Businesses

Discussion:

- The New Jersey Board of Public Utilities explained the applicable programs for homeowners and businesses in two parts: Renewable Energy and Efficiency. For comprehensive details, visit their website (see above meeting materials #9 and #10).
- BPU currently has $120-130 million in the program for rebates (1/3 for renewable energy, 2/3 for energy efficiency)
- Overall goals of both renewable energy and energy efficiency rebate programs are:
  1. Cover costs through rebates until it is cost-efficient and readily available in the market.
  2. Programs cover costs until standards are required by regulations: example, Energy Star (standards being upgraded in 2006 and DCA will need to adopt, which will eliminate the need for rebates)

- Energy Efficiency Programs Overview (see website for all programs and details)
  - Home Programs
  - Traditionally, programs are run through the utilities and may be run through contractors in the future. Rebates exist for upgrading systems for the most efficient equipment. Currently, there are rebates for: new A/C, room A/C, and heating systems. Geothermal systems are not rebated anymore as it is cost-effective to install and operate these. Different programs exist for people with low incomes.
  - A web tool exists to teach homeowners about saving money and reducing energy demand: Home

Analysis
  - Programs for Restaurants
    - Studies have shown that simple maintenance and installation of efficient equipment will save energy and money. Requirements are only for certain systems and problems arise because equipment and systems are not inspected and/or not installed properly.
    - Offer of a rebate results in low cost or no cost to the establishment (i.e., the cost of replacing a refrigerator will be returned within 6 months).
- Renewable Energy Programs Overview (see website for all programs and details)
  - Long-term Goal: 6% of energy consumption should be renewable energy by 2012
  - Short-term Goal: by Dec. 2008 -- 300 MW covered by Class 1 energy sources, 90 MW covered by Class 2 energy sources (solar)
  - Programs are divided into 2 groups:
    - Class 1: Wind, biomass
    - Class 2: Solar
  - Clean Energy: Solar or any Class 1 renewable (most popular)
  - 65-70% installation costs covered
  - Tiered program
  - Works during hot/peak energy demand days
  - Effectively reduces the cost of electricity
  - Net metering: Concept of solar energy producing excess electricity that is then supplied to the electric grid, and in effect, the meter runs backwards in a home and a rebate is received from the utility.
  - Solar Renewable Energy Certificates (SREC): Each time a solar electric system generates 1000kWh (1MWh) of electricity, an SREC is issued which can then be sold or traded separately from the power. They can be sold on the market for $200-250.
  - Other programs:
    - Renewable Energy Project Grants and Financing
    - Renewable Energy Business Venture Assistance
- Other Renewable Energy and Energy Efficiency programs:
  - BP Solar/Home Depot Partnership
    - Cost of solar system is expensive and is not practical without the rebate
    - BP Solar Online Calculator: For homeowners to estimate the cost of a system in their area is available on the web at http://www.bp.com/solarsavings.do?categoryId=3050524 (or use link above).
  - Home Energy Performance
    - Implements requirements of Energy Star
    - Developed in NY state for existing homes
    - Completed by trained technicians
    - 2 million existing homes in NJ (90% of all homes): The effort should be focused in this area.
  - Home Tune-Up
    - A cost-effective program for homeowners entailing inspections of existing homes
  - Solar Hot Water Heating
    - Available where natural gas is not
- Evolving technologies:
  - Geothermal: in-floor radiant heat. Effective geothermal energy depends on surrounding environment (heat comes from the ground and moderates fluids to about 55 deg. F). Stockton College is an example of a working location suitable for geothermal energy. The cost depends on the specific situation.
  - Passive solar homes/no utility homes: NJBPU has not pushed these programs.
  - DOA Solar Program: Analyses for solar energy have been conducted on farms. The results have been positive (public needs to see the realized benefits before buying into program), pilots included education and trial/error (all needed for a successful program) (suggestion)

- The following suggestions were discussed in detail:

1. Extend rebates to get more of the public involved combined with a general public education and outreach effort on renewable energy and energy efficiency.
   - Rebates are based on kw installed and result in many benefits. There was debate about how many people actually know about the program: Many applications may be pending for rebate programs but 2 million homes exist in New Jersey. NJBPU has education and outreach about the benefits of their programs (e.g., Clean Energy Conference on September 26).

2. Mandate geothermal or solar energy for new homes and businesses and require equipment upgrades for existing homes and businesses
   - Makes economic sense to mandate
3. Require clean energy systems for homes over a certain size
   - Currently, NJBPU caps rebates at a certain size (defined by square footage).
   - Similar existing efforts are in place for clean energy developments in Camden and Atlantic City.
4. Mandate that builders provide homeowners with clean energy options at the time of construction and/or require that a certain percentage of homes are predesigned with geothermal/clean energy options ready for purchase and are available to low-income families
   - Issue: Many homes are built before they are purchased, i.e., model homes and developments
   - Issue: Geothermal energy is not the best solution for every situation; all aspects need to be investigated before possible implementation.
5. Instead of mandates, extend existing NJBPU programs to incorporate more benefits for builders.
   - Note: National Tour of Solar Homes, New Jersey Tour of Homes, October 1, 2005
6. Mandate that clean energy systems be required for new commercial and industrial buildings and include maintenance and upgrade specifications for existing buildings.
   - 90% of cost is fuels and maintenance – if efficient systems are installed, significant savings are realized
     - Example: Johnson & Johnson (people will follow by example)
   - NJBPU currently has a program for faith institutions to help run the buildings efficiently.
   - NJDCA has codes for the building designs to comply with the current energy code. There is a mechanism in the New Jersey building codes for energy efficient installation. In 2006, there will be advancing requirements that NJDCA will adopt into their existing codes.
   - Leadership in Energy and Environmental Design (LEED) voluntary program requirements are not referenced in the codes.
7. Mandate a program that meets certain standards that are widely accepted by creating minimum standards for all appliances
   - Some appliances do have minimum standards in New Jersey; manufacturers cannot make appliances that do not meet certain standards and there are tax credits available to meet new standards.

Conclusion: New Jersey has the best, if not one of the best, renewable energy programs in the country. Through the discussion of strategies for renewable energy and energy efficiency, it was clear that more could be done in New Jersey to reduce energy demands by utilizing the NJBPU programs, in conjunction with the NJDEP, to support a stronger effort in the state.

Action Items/Person(s) responsible/Deadline:

1. Provide more detailed suggestions on how NJDEP and NJBPU can work together on strategies - NJBPU

Topic 4: Using Restaurant Grease as an Alternative Fuel (Fry-O-Diesel)

Discussion:

- Fry-O-Diesel: A company in Philadelphia that will convert used restaurant grease, known as "yellow grease," and make B20 and B100 blends for an alternative diesel fuel. Their goal is "...to establish a production facility capable of producing three million gallons per year of B100 which, when blended, will produce 15 million gallons per year of B20. For optimum performance in Pennsylvania's cold weather climate, fuel will be distributed as a B20 blend (20% biodiesel, 80% petro-diesel). Fry-O-Diesel will be produced from waste vegetable oil (yellow grease and trap grease) collected from restaurants, food service companies and renderers." http://www.fryodiesel.com/EnergyHarvest.htm
- Doing this will serve to:
  - Alleviate the water and waste issues caused by restaurant waste
  - Provide an alternative energy resource
- Problems discussed with the strategy:
  - Transportation/distribution
  - Market exists for the end-product but the processing aspect is unclear
  - Fits more into biodiesel/renewable fuels since the fuel is not used in homes or restaurants
  - Benefits are realized in other areas besides immediate restaurants benefits such as reducing waste and saving costs of disposal (cheap or no costs)

Conclusion: The group decided that the issue should be discussed in another workgroup that is reviewing alternative fuels.

Action Items/Person(s) responsible/Deadline: None

Wrap-up

1. A request for additional suggestions/ideas/comments was announced to the group.
    - Additional ideas and suggestions should be emailed to airworkgrouphr@dep.state.nj.us
2. Next steps:
    - Share idea table with the workgroup participants once suggestions from this meeting are incorporated
    - Next meeting: Wrap-Up and Review
    - A rough draft report: by Sept. 14

- All information will be posted on the Homes and Restaurants Workgroup website at http://www.state.nj.us/dep/airworkgroups/home_restaurant_workgroup.html

The Next HR Workgroup Meeting is Wednesday, September 14, 10 AM at NJDEP in Trenton. Room location and conference call logistics are provided on the HR website (see calendar links) and in the meeting agenda.

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 1e: Summary of Workgroup Meetings: Meeting Minutes from September 14, 2005

October 31, 2005

SUMMARY

Monday, September 19, 2005
Revised: Friday, September 30, 2005

Homes and Restaurants Workgroup Meeting

Held: September 14, 2005
Meeting Location/Address:
NJDEP Headquarters Building, 401 E. State St., Trenton, NJ
Meeting called by: Ray Papalski
Co-Facilitators: Sandra Cohen, Laura Scatena

Attendees:

State Team Members:

1. Ray Papalski, Workgroup Leader, New Jersey Department of Environmental Protection (NJDEP), Division of Air Quality Planning (DAQ), Bureau of Air Quality Planning (BAQP)
2. Sandra Cohen, Co-Facilitator, NJDEP DAQ BAQP
3. Frank Matula, NJDEP, DAQ, Bureau of Technical Services
4. Tom Pitcherello, New Jersey Department of Community Affairs (NJDCA)
5. Jim Scarvalli, NJDEP, Division of Compliance and Enforcement (DCE), Minor Source Compliance Investigation
6. Laura Scatena, Co-Facilitator, NJDEP DAQ BAQP

Participants:

1. Adeline Arnold, Aberdeen Township Environmental and Shade Tree Advisory Board (by phone)
2. Steve Brown, LCSystems, Inc. (by phone)
3. Kenneth Fradkin, United States Environmental Protection Agency (USEPA) Region 2 (by phone)
4. Jack Goldman, Hearth, Patio & Barbecue Association (HPBA) (by phone)
5. Ronald Jackson, New Jersey Board of Public Utilities (NJBPU), Office of Clean Energy
6. Anne Leimbach, Mid-Atlantic HPBA (by phone)
7. Jeff Lynch, White Castle (by phone)
8. Jeff Miller, White Castle (by phone)
9. Vince Patram, Engelhard Corporation
10. Arnold Schmidt, Union County Health Department
11. Rich Vaccaro, Madisan-Vector
12. Ed Wengryn, New Jersey Farm Bureau
13. John Whitaker, White Castle
14. T. Wong, White Castle (by phone)
15. Jerry Woodward, Hearth and Home Technologies (by phone)

Please send your complete contact information to airworkgrouphr@dep.state.nj.us*, if you have not done so.*

Materials:

1. Agenda
2. Last meeting summary (8-17-05)
3. Consultation meeting minutes (8-11-05) (sent by email 9/7/05 and 9/13/05) (hardcopy)
4. Draft Recommendations (sent by email 9/9/05 and 9/13/05) (hardcopy)
5. Prioritized List of Ideas (sent by email 9/9/05) (hardcopy)
6. Assignment Tracking (sent by email 9/7/05) (hardcopy)

Introduction/Announcements

1. Roll call (21 participants, see list above)
2. Review meeting agenda
   - The purpose of the meeting was to wrap-up previous discussions on recommendations for further consideration and incorporate them into the report.

Overview

1. Review minutes from previous meeting and obtain feedback.
   - The minutes from previous meetings were emailed to the workgroup. Members were reminded that they may send feedback on the minutes.
2. Report out on assignments completed/status.
   - There were assignments/action items from previous meetings that were not completed. A request was made to send the information to the workgroup team so that the NJDEP has the information to make informed decisions on the recommendations submitted by the workgroup.
3. Follow-up on Old Business.
   - This was the main purpose of the meeting. See next 'Overview' agenda item.
4. Introduce topics for this meeting.
   - The goal of the workgroup: To discuss ideas to reduce air pollution from the air emission sources in the Homes and Restaurants category and list all ideas suggested by the workgroup members that will be included in the workgroup report to be sent to the NJDEP Management.
   - Consensus was not needed for every recommendation and for those who had an opposing view may provide additional comments through a white paper that will be included in the report as an appendix.
   - Future goals:
     - September 30: Draft version of the workgroup report reviewed by members
     - October 31: Final workgroup report submitted to the NJDEP
   - Request for comments/feedback/questions?
     - None

Discussion: Wrap-Up and Review

Agenda Items:

1. Consensus Items
2. Non-Consensus Items
3. What did we miss in the Homes and Restaurant category?

These 3 agenda items were discussed simultaneously as the workgroup reviewed the draft recommendations and prioritized list of ideas. A laptop and projector were used at the meeting to make changes as items were being discussed. Please see the updated version of these lists.

Topic 1: Idea Table: Request for corrections and comments

Discussion:

- Document reviewed: The comprehensive table of ideas from the workgroup members
- The only change requested was for Recommendation O11 (please see revised table for changes)

Conclusion: None

Action Items/Person(s) responsible/Deadline: None

Topic 2: Priority List, A. Public Education and Outreach

Discussion:

- With respect to public education and outreach, suggestions were made regarding the NJDEP website: (1) The pathways to the workgroup webpages should be easier, (2) the workgroups should have a permanent website, and (3) average citizens should be automatically notified on updates or issues of concern, e.g., Ozone Alert Days. In response to item (3), the only notification at the time of the meeting was the listservs. For any additional comments on the NJDEP website, Sandra Cohen may be contacted. *(Please see the Homes and Restaurants Member List for complete contact information.)*
- Additional suggestions were made for expanding the scope of the public education and outreach strategy:
  1. Expand B3 to include traditional avenues, such as newspapers, letters to the editor, fact sheets,

Public Service Announcements (PSAs)

2. Model an air education and outreach strategy after the nonpoint source/stormwater campaign since it is a similar effort with similar goals (www.cleanwater.org). An example of an outreach effort was the municipality newsletters with simple fact sheets about stormwater and what citizens should and should not do to reduce stormwater pollution.

- Z2 was changed to state "Expand" rather than "Extend" since extending the program created confusion and did not infer that the recommendation meant to increase the universe of eligible appliances and increase the amount of the rebates.
- In response to increasing the amount of rebates, other sources of funding would need further investigation since the NJBPU has a limited budget (more projects than available funding). Such sources included federal grants, e.g., EPA, NOAA – could be modeled after the NJDEP's water program. An air program may be eligible for Clean Water Act Section 319 funds if a correlation between air and water quality is demonstrated.

Conclusion: With the changes discussed and comments made, the table and report will be updated and the workgroup will review for additional comments.

Action Items/Person(s) responsible/Deadline:

1. Add any discussion notes into the recommendation table – H&R Team *Done
2. Write a detailed analysis for this section in the report – H&R Team

Topic 3: Priority List, B. Regional Wood Stove Change-Out Program

Discussion:

- N4: Consensus to keep the recommendation but specify the options for a change-out program: USEPA-certified stoves, natural gas, and propane
- N6 suggestions for changes, additions:
  1. Include conversion to gas or alternative fuel
  2. Inspect fireplace and stove upon change/sale of home
  3. Change the UIC code, with the possibility of modeling the strategy after New Jersey's stormwater program *(Fits into the standards of wood burning equipment – see section D.)*
  4. Add training requirement for inspectors; cross-reference to that requirement listed under recommendation N9.
  5. Reference National Fire Protection Association (NFPA) 211 standards, Chapter 11, which could be adopted as local code (ANJEC (voluntary) or rule (mandatory). The standards suggest annual checking of system on an annual basis and a more intensive clean-out of the unit. *(Fits into the standards of wood burning equipment – see section D.)*
     - There were differing views on whether the standards address efficiency in addition to fire prevention and whether the build-up of creosote or proper operation affecting efficiency was the problem.
  6. For those who have units or purchase new units, add a newsletter explaining the applicable regulatory requirements.
  7. For inspections of units, consider including insurance company criteria based on homeowner surveys in order to issue a policy, banks (i.e., mortgage criteria), and fire department inspections, in addition to the home inspection requirements listed as part of the strategy.

- The goal of the measure was to get at existing units, which are more polluting. At the time of the meeting, there were ASTM task forces reviewing options for wood burning units such as adding a catalyst at the bottom of the vent or putting doors on a unit to achieve potential emission standards. *(Comment fits into the standards of wood burning equipment – see section D.)*

Conclusion: With the changes discussed and comments made, the table and report will be updated and the workgroup will review for additional comments.

Action Items/Person(s) responsible/Deadline:

1. Add any discussion notes into the recommendation table – H&R Team *Done
2. Write a detailed analysis for this section in the report – H&R Team

Topic 4: Priority List, C. Neighbor-to-Neighbor Complaints

Discussion:

- B12: The New Jersey Air Pollution Control Act (APCA) exempts 1 and 2 family residences; therefore, changing the State APCA allows local governments to regulate residential wood burning. Many homes in New Jersey are within close proximity to each other, thus making the strategy applicable to improving indoor air quality as it applies to public health. B12 does not address residential BBQs/grills but there was still a question of how to address residential use of outdoor smokers/smokehouses.
- A suggestion was made to make "C" last as complaints are reactive and most municipalities require nuisance codes. The workgroup members agreed.

Conclusion: With the changes discussed and comments made, the table and report will be updated and the workgroup will review for additional comments.

Action Items/Person(s) responsible/Deadline:

1. Add any discussion notes into the recommendation table – H&R Team *Done
2. Write a detailed analysis for this section in the report – H&R Team

Topic 5: Priority List, D. Standards for Wood Burning Equipment

Discussion:

- Comments on the recommendations for further consideration listed under section D:
  1. Current ASTM effort, including members of industry: analyzing options for technical standards.
  2. Banning outdoor wood boilers could prevent the generation of new, more efficient technology. Currently, there are 15 manufacturers nationally, which would probably be reduced once regulations are in place.
     - May also violate Interstate Transport of Commerce Laws
  3. A building permit is required under New Jersey's DCA code. A need exists for variation in the code but there are no criteria to do so. Therefore, the strategy should include siting criteria, standards on equipment, and fuel source.
     - A permit for outdoor wood boilers would be required in New Jersey. Upon issuance of permit, information regarding regulations and requirements would be included; done by local permitting and regulating type of fuel.
     - Replace O16 with O14 and then expand to address fuel source restrictions as well as siting and stack height (NJDCA) regulations. *This was also added to ID# O15. If there are any issues with this change, please contact the Homes and Restaurants Workgroup.*
  4. Add: Manufacturer warranty restrictions and "best burn practices" plus state regulations
  5. Counties may want to restrict/ban units based on health concerns
  6. A wood boiler is a wood burning appliance but it is not open burning, therefore Subchapter 2 does not apply.
  7. Add: Implement local restrictions on what can be burned in outdoor wood burning practices
  8. Add: Grandfather existing units (until change of unit of sale of house, which would require a permit)
     - The strategy does not grandfather improper fuel source
     - Outdoor wood boilers are a small segment of the heating system population
  9. Adopt Washington/Oregon standards – agreed upon
     - N8: Cross-reference to NJDCA codes – agreed upon
     - Change home inspector to code official
  10. N5: Delete from Section D; note: cost-prohibitive
     - Add an education and outreach component at the point of sale and/or through local government fact sheets, etc.
  11. N9: Precludes licensed contractors. A brief discussion followed regarding whether the retailer should be responsible for training installers or provide lessons to homeowners wanting to install units on their own. There was general consensus among the workgroup that a retailer should not have this responsibility for safety reasons since the units are combustion units. Even if a homeowner decided to do a self-installation of a unit, a local permit and construction inspection would still be required.
     - In the Pittsburgh change-out program, buyers wanted to install replacements themselves and this was generally accepted. However, it was suggested that installation would need to be clarified for a program, including the cost to install a unit, which would depend on the condition of the unit/system. *(N4)*

- Suggestion: Add free installation as part of the rebate or reduce the fixed value *(N4)*
  - The decision on how the rebate works is the retailer's decision but the homeowner would still be eligible for the rebate. To qualify for the rebate, the old stove must be removed. During a change-out program, the need for professional installation (i.e., safety and health issues) should be explained.
  - Suggestion: Incorporate local installation requirements and permits into building a plan for the program

Conclusion: With the changes discussed and comments made, the table and report will be updated and the workgroup will review for additional comments.

Action Items/Person(s) responsible/Deadline:

1. Add any discussion notes into the recommendation table – H&R Team *Done
2. Write a detailed analysis for this section in the report – H&R Team

Topic 6: Priority List, E. Restaurants Controls

Discussion:

- In order to adopt California's standards on charbroiling, make more restrictive standards, or develop New Jersey's own standards, a rulemaking team would be formed and many of the issues raised by the workgroup members would be addressed in this formal process but they cannot be resolved in this workgroup.
- The workgroup was reminded of the USEPA's pilot program for applying charbroiling controls on a restaurant in the Northeast. Suggestions for the restaurant to be selected for the project were discussed (see Action Items).
- Comments on the recommendations for further consideration listed under section E:
  1. Statistics:
     - Air emissions comparisons: Most emissions come from charbroiling (240 burgers from one restaurant is like 3 cars/day, which would be like removing 1000 cars/year)
     - Costs to the restaurant industry in New Jersey: $440 million ($20,000 x 22,000 restaurants)
  2. The catalysts that were available to control emissions from restaurant equipment were clarified. There are 2 types of broilers:
     - Charbroilers, which is underfired charbroiling (e.g., Burger King)
     - Upright broilers
       - Catalysts are not available for underfired broilers but this can be investigated.
       - Catalysts are available for upright broilers and would be a new purchase.
  3. California's standards focus more on nitrogen oxide (NO) than particulate matter (PM) (which is one of New Jersey's priorities). The technology used to reduce NO targeted the chemical reactions and not PM removal. Therefore, there are more suitable strategies to reduce PM, e.g., 2-stage filter removal technology that also reduces visible emissions.
     - A recent American National Standards Institute (ANSI) standard could be referenced that was funded by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
     - There are new standards that apply to the efficiency of cooking processes. A suggestion was made to consider looking into cooking processes and not just cooking equipment as the emissions can be different.
     - Suggestion: During the regulatory process, do not assume that California is the best model for New Jersey. Also, consider the cross-media impacts (e.g., solid waste generation).
       - California focus: Odors – targeted by chemical reactions
       - New Jersey focus: PM – if filters are used, the amount of trash would increase because the filters are not washable but need to be replaced. Therefore, the volume of chemicals and amount of trash would increase.
  4. Suggestion: Do not regulate area? No significant reductions?

Conclusion: With the changes discussed and comments made, the table and report will be updated and the workgroup will review for additional comments.

Action Items/Person(s) responsible/Deadline:

1. Arnie Schmidt to send Ray Papalski the restaurant in New Jersey that had a complaint filed against it that uses charbroilers.

2. Add any discussion notes into the recommendation table – H&R Team *Done
3. Write a detailed analysis for this section in the report – H&R Team

Topic 7: Priority List, F. Low Sulfur Fuel Oil for Home Heating

Discussion:

- There was consensus among the workgroup members to keep the strategy for a regional low sulfur content limit for home heating oil in the Northeast.
- Given the recent national events (i.e., destruction caused by Hurricane Katrina and the rise in fuel prices), the strategy might not be socially acceptable.
- Refineries in Northeast cannot always accomplish low standards due to their limitation on the types of crude oil they produce.

Conclusion: With the comments made, the table and report will be updated and the workgroup will review for additional comments.

Action Items/Person(s) responsible/Deadline:

1. Add any discussion notes into the recommendation table – H&R Team *Done
2. Write a detailed analysis for this section in the report – H&R Team

Topic 8: Priority List, G. Homebuilders – Energy Efficiency Options

Discussion:

- Comments on the recommendations for further consideration listed under section G:
  1. Include outreach to builders about the availability of rebates for energy efficiency/clean energy options. *(Z7)*
  2. Add a requirement that future system changes must be equal to or better than the energy efficient/clean energy system, in terms of efficiency. *(Z5, Z8)*
     - Expand rebates for the other systems; otherwise, they would not be cost-efficient.
  3. Add: Increase marketing, public relations, education, and outreach (e.g., homebuying websites) *(Z5)*
  4. Add: Investigate tax credits *(Z7)*
  5. Z6, potential problems: (1) No named buyers for the predesigned energy efficient homes and (2) offsetting the costs of constructing energy efficient homes with the variable nature of home markets.
     - Potential positive outcomes and response to the problems posed: (1) The demand for energy efficient homes might increase, thereby making energy efficient homes marketable for the homebuilder and (2) an independent group would need to analyze demographics (costs to implement Z6).
  6. A general concern was raised as to the responsible party that would cover potential problems and/or environmental threats with energy efficient systems. *(Z5, Z6, Z8)*
     - One response to this concern was that solar panels, for example, have a warranty for 25-30 years, thereby providing for free replacements if problems arise with the equipment.

Conclusion: With the changes discussed and comments made, the table and report will be updated and the workgroup will review for additional comments.

Action Items/Person(s) responsible/Deadline:

1. Add any discussion notes into the recommendation table – H&R Team *Done
2. Write a detailed analysis for this section in the report – H&R Team

Topic 9: Priority List, H. Subchapter 2

Discussion:

- Comments on the recommendations for further consideration listed under section H:
  1. Change farmland exemption to “farmland/forest assessment eligible” *(O4)*
     - 5-10% of farmers do not apply to this exemption and applying the idea as is would prevent the 5-10% from practicing best management practices
  2. Delete “severe” – replace with “accepted silvicultural practices, best management practices” *(O4)*
  3. O8: Consider increased fines
  4. Consider expanding the scope of subchapter 2 to delete exemption for stack or chimney *(O18)*
     - Change the definition of open burning by removing the language after “…open air…”: “Open

burning" means any fire from which the products of combustion are emitted directly into the open air, and are not by design directed through a stack or chimney. NJAC 7:27-2.1
- Subchapters 4 and 11 were implemented to control stack emissions.
- Determining the consequences of changing the definition of open burning may be beyond the scope of the workgroup.

5. As discussed in previous meetings, O7 was not intended to exclude campfires but prevent fires on high ozone days, which usually coincide with days that have a high risk of fire when fires are not allowed in parks and state forests.

Conclusion: With the changes discussed and comments made, the table and report will be updated and the workgroup will review for additional comments.

Action Items/Person(s) responsible/Deadline:

1. Add any discussion notes into the recommendation table – H&R Team *Done
2. Write a detailed analysis for this section in the report – H&R Team

Wrap-up

1. Assignments
   - Any outstanding action items should be sent to airworkgrouphr@dep.state.nj.us.
2. Logistics for next steps
   - To be determined at a later date. If members would like to come to the NJDEP for the conference call, they may do so.
3. Feedback
   - Workgroup members should provide comments on the updated materials (table and report) once they are sent.
   - Request for other feedback: If the workgroup members have any additional comments or suggestions on the workgroup process, they should be sent to airworkgrouphr@dep.state.nj.us.

- All information will be posted on the Homes and Restaurants Workgroup website at http://www.state.nj.us/dep/airworkgroups/home_restaurant_workgroup.html

This was the Final HR Workgroup Meeting.
A workgroup meeting for all of the workgroups will be held on November 14, 2005 at the NJDEP in Trenton. More details will be posted on the website.

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 2: Data Reviewed by the Homes and Restaurants Workgroup (Handouts Provided to the Workgroup in Addition to Other References)

October 31, 2005

The Homes and Restaurants Workgroup Report
October 31, 2005

Appendix 2. Data Reviewed by the Homes and Restaurants Workgroup (handouts provided to the workgroup in addition to other references)

The following list reviews the data and other relevant sources of information used by the Homes and Restaurants Workgroup.

a. Data and References from June 29, 2005

1. Workgroup Presentation, June 29, 2005, pdf file available at *http://www.state.nj.us/dep/airworkgroups/*
2. List of Applicable Websites (handout)
3. United States Environmental Protection Agency (USEPA) Wood Stove Change-Out Campaign, *http://www.epa.gov/woodstoves/changeout.html*
4. USEPA Partners, *http://www.epa.gov/woodstoves/partner.html*

b. Data and References from July 13, 2005

1. Title 40 Code of Federal Regulations Part 60. "Subpart AAA—Standards of Performance for New Residential Wood Heaters." Accessible at *http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=c59f307b39a9d33d324266d576e01864&rgn=div6&view=text&node=40:6.0.1.1.1.63&idno=40*.

c. Data and References from July 27, 2005

1. New Jersey's Air Pollution Control Act (26:2C-22.Relation of local ordinances or regulations to State law). Full version accessible at *http://www.nj.gov/dep/enforcement/apca.html*.
2. New Jersey Administrative Code (NJAC), Title 7, Chapter 27, Subchapter 2: Control and Prohibition of Open Burning. Accessible at *http://www.state.nj.us/dep/aqm/Sub%2002%20v1994-06-20.pdf*.
3. New Jersey Administrative Code (NJAC), Title 7, Chapter 27, Subchapter 5: Prohibition of Air Pollution (includes odor provisions). Accessible at *http://www.state.nj.us/dep/aqm/Sub05.pdf*.

d. Data and References from August 17, 2005

1. New Jersey Administrative Code (NJAC), Title 7, Chapter 27, Subchapter 5: Prohibition of Air Pollution (includes odor provisions). Accessible at *http://www.state.nj.us/dep/aqm/Sub05.pdf*.
2. "Final Staff Report: Proposed New Rule 74.25, Restaurant Cooking Operations Proposed Revisions to Rule 23, Exemptions from Permit." Ventura County Air Pollution Control District. August 31, 2004. Accessible at *http://www.vcapcd.org/pubs/Rules/Rule7425/R7425_SR0831.pdf.*

3. "Rule 1138, Control of Emissions from Restaurant Control Emissions." South Coast Air Quality Management District. Adopted November 14, 1997. Accessible at *http://www.arb.ca.gov/drdb/sc/curhtml/r1138.htm*.
4. "Assessment of Emissions from a Chain-Driven Charbroiler (NEICO Model 9025, Golden West Equipment, Inc.) Using a Catalytic Control Device (Model 7-193)." Engelhard Corporation. September 13, 2002.
5. Murr, A. "No More Electric Bills." Newsweek. August 15, 2005. Accessible at *http://msnbc.msn.com/id/8852127/site/newsweek/.*
6. New Jersey's Clean Energy Program, *http://www.njcleanenergy.com/*
7. New Jersey's Renewable Energy Program, *http://www.njcep.com/*
8. Engelhard CHARCat™ 900, Charbroiler Catalysts Fact Sheet
9. Fu, J. C., Bouney, A., Czarnecki, L., Patellis, C., and Whittenberger, W. "Catalytic Method for Controlling Restaurants." Engelhard Corporation.
10. "Restaurant Industry at a Glance: New Jersey." National Restaurant Association. December 2004. Accessible at *http://www.restaurant.org/pdfs/research/state/newjersey.pdf*. (provided after the meeting)

e. Data and References from September 14, 2005

No additional external data or references were included for this meeting.

f. Other data not presented at a meeting but used for the report

1. See Section VIII. References.

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 3: Tables of All Control Measure Suggestions from the Homes and Restaurants Workgroup

October 31, 2005

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
N1	a) Ban all wood burning in new and existing sources b) Ban all wood burning and require only natural gas/propane fireplaces can be built in new construction (i.e., put a restriction on developments with a certain amount of houses, e.g., 5-10, that would be required to install only natural gas or propane units) - similar to N2 and N3 (see for further details)	Residential Wood Combustion (indoor)	b) Other states do this already to some degree	b) $1500-3500/unit	a, b) PM reduced, improved indoor/outdoor air quality. Banning all fireplaces in new construction will also ban gas logs or pellet stoves, cleaner option for fireplaces.	

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

	Implementation					
Other Comments	**General**	**Environmental Justice/Social**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
	a) Not socially feasible to ban all wood burning in new construction or in existing units in homes.		a) None - new legislation would be required b) No existing authority for a policy prescribing the exact type of fuel used to heat a home or for aesthetics; operational standards could be applied by NJDCA if based on authority from another department (e.g. NJBPU ban on electric home heating based on energy conservation concerns).	a, b) Large homeowner issue and resistance should be expected. Education is key to gain support from homeowners; not banning all wood burning	a, b) Difficult	a) No b) Yes

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
N2	Instead of restricting the developers to all or nothing in new developments, require that only a certain percentage be natural gas, propane, or of a certain type of fuel.	Residential Wood Combustion (indoor)	Other states do this already to some degree		PM reduced, improved indoor/outdoor air quality.	
N3	Restriction on wood burning sources: Ban and/or require inserts/fireplaces with specific efficiency lower than the current USEPA standards for wood stoves and fireplace inserts who would be affected dependent on #/type of new homes built and #/type of appliance/fuel source	Residential Wood Combustion: New fireplaces and existing wood stoves and fireplaces	Other states do this already to some degree (e.g., Washington and Oregon)	Minimal (as most wood stoves and fireplace inserts already meet the lowest levels set by the state standards)	**Pros:** PM reduced, improved indoor/outdoor air quality. **Cons:** Little significant environmental benefit from existing sources; diminishing return.	

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

	Implementation					
Other Comments	**General**	**Environmental Justice/Social**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
	Unnecessary as the number of wood burning units in new developments is small, thus it would be inefficient to restrict the number of wood burning units any further. Other states do this already to some degree.		No existing authority for a policy prescribing the exact type of fuel used to heat a home or for aesthetics; operational standards could be applied by NJDCA if based on authority from another department (e.g. NJBPU ban on electric home heating based on energy conservation concerns).	Large homeowner issue and resistance should be expected. Education is key to gain support from homeowners.		Yes
Prefer to set wood stoves and fireplace inserts standards similar to Washington and Oregon for all new units sold in New Jersey.	Other states do this already to some degree (e.g., Washington and Oregon)	Low income households may be dependent on wood heat		Large homeowner issue and resistance should be expected. Education is key to gain support from homeowners.	Easy enforcement at the manufacturer level	Yes

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
N4	Voluntary wood stove change-out program: Tax rebate and/or industry discount and/or USEPA-sponsored exchange program and/or utility company rebate for replacing an older, more polluting wood stove or fireplace insert with a new, higher efficiency, less polluting unit (including, but not limited to, USEPA-certified stoves, natural gas, and propane). An education component (television and newspaper ads, brochures, fact sheets, pamphlets, etc.) should be included in the program.	Residential Wood Combustion: New fireplaces and existing wood stoves and fireplaces	The National Hearth, Patio, and Barbecue Association has had many years of experience conducting successful change-out programs and working with the USEPA. A wood stove change-out program has been done in several areas in several states. The responsibility of installation would need to be clarified.	$1000/unit estimate after rebates; some programs have no cost; rebates can be from the manufacturer, utility company, sales tax exemption, income tax credits, or the federal government (see energy bill: discount of 25%, capped at $3,000 for "pellet stoves" that can replace older wood stoves). The cost to install a unit depends on the condition of the unit/system.	**Pros:** PM reduced, improved indoor/outdoor air quality, 90% less pollutants emitted from new USEPA-certified stoves vs. older conventional stoves. **Cons:** Potential increase of dioxins	How the costs will change in the future and if Congress will fund the rebates for new pellet stoves in the new energy bill. Adding free installation as part of the rebate or reducing the fixed value would need to be determined by the retailer.

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

	Implementation					
Other Comments	**General**	**Environmental Justice/Social**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Other incentives can include informing the public of economic benefits, such as saving 30% in wood use from using a new stove (provided as an example). Focus on more efficient units or an alternative heating system such as gas.	Targeted approach – identify areas of high PM and gas service available. Need to have all 3 fuel options available for a successful program: USEPA-certified, pellet, and natural gas or propane options.	Low income households may be dependent on wood heat - give new stoves for free to people with lower incomes. Wood stoves, in general, are not used for aesthetic purposes but for heating the home. So requiring the use of natural gas, instead of allowing burning wood, would effectively preclude a person from supplementing their home heating needs with a wood burning stove.	Voluntary agreement between manufacturer, local or state government, utility company	Local programs have been successful (in CA, MI, MT, OR, WA); need to conduct during Jan - Mar/Apr to not compete with peak selling season	Voluntary to none. Incorporate local installation requirements and permits into building a plan for the program.	Yes

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
N5	Retrofit all types of existing wood burning units with a catalytic control	Residential Wood Combustion: All existing indoor wood burning equipment	There are no known companies that can cost-effectively manufacture and mass-produce a safe, standard retrofit for all types of fireplaces. The ASTM effort for fireplaces is to create a protocol for measuring emissions and very possibly an emissions limitation. This will drive companies to find solutions to reduce emissions, which presumably could include solutions using catalysts.	$1000/unit. The main problem with designing new retrofits is the high cost.	PM reduced, improved indoor/outdoor air quality	How the costs will change in the future.

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

	Implementation					
Other Comments	**General**	**Environmental Justice/Social**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Add an education and outreach component at the point of sale and/or through local government fact sheets, etc.	May be as inexpensive as completely replacing the wood burning stove or fireplace with a new USEPA-certified unit.	Low income households may be dependent on wood heat	None - Air pollution control does not apply to one or two family residences	Public acceptance not expected	Difficult	No

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
N6	Require replacement or alternative heating system of older wood stoves and fireplaces upon sale of residential (commercial) property (i.e., like done with lead paint removal), in addition to requiring an inspection of existing wood stoves or fireplaces, regardless of age, to see if it is working properly done only by trained professionals (see N9). Include a newsletter explaining the applicable regulatory requirements with the new or replacement unit/system and/or the sale of the home.	Residential Wood Combustion: New fireplaces and existing wood stoves and fireplaces	Less polluting USEPA-certified wood stoves and fireplaces exist. Possible options to meet new standards include adding a catalyst at the bottom of the vent or putting doors on a unit.	$1500-2000 per change-out	Pros: PM reduced, improved indoor/outdoor air quality. Cons: Potential increase of dioxins if new wood stoves are installed	1) Number of existing pre-1992 wood stoves and fireplaces in New Jersey 2) Number of post-1992 USEPA-certified wood stoves in New Jersey 3) Number of homes in New Jersey that are sold each year and have an existing wood stove or fireplace

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

	Implementation					
Other Comments	**General**	**Environmental Justice/Social**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
	Phasing out existing wood stoves and fireplaces if sufficient authority could be substantiated including: 1) sale of home triggers inspection and change-out to new USEPA standard wood stove; would require replacement, retrofit or disconnection of any stoves. Regulation already exists in California.		None - New legislation would be needed.	Large homeowner issue and resistance should be expected. Education is key to gain support from homeowners. This strategy could work but there may be resistance from the real estate field.	A voluntary program can accelerate the rate of change-outs. The strategy must include: (1) Inspection requirements (e.g., inspections are visual or performed by taking a core sample of the catalyst to see if it is still working) for new and existing wood stoves. (2) Mandatory requirements/standards for a new catalyst to be installed if the home has an existing USEPA-certified stove that does not work because the catalyst is corroded. (3) All wood stoves pre-1992 must be replaced with an USEPA-certified wood stove. (4) For wood stoves with after-burners, require that the flue must be inspected. Options for inspection requirements: insurance company criteria based on homeowner surveys in order to issue a policy or alter the rate of the policy, banks (i.e., mortgage criteria), and fire department inspections.	Yes

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
N7	Change NJDCA code (statewide) to require all new and replacement wood stoves comply with USEPA standards and have the code official ensure that only an USEPA-certified unit was installed. This would be done through the "local permit" process.	Residential Wood Combustion: Wood stoves in new construction	Less polluting USEPA-certified wood stoves and fireplaces exist		**Pros:** PM reduced, improved indoor/outdoor air quality. **Cons:** Potential increase of dioxins if new wood stoves are installed	
N8	Update/revise USEPA rules/standards, then adopt by the NJDEP, and cross-referenced into the NJDCA construction codes.	Residential Wood Combustion: Fireplaces in new construction	There are no current plans to revise the federal standard. An ASTM task force developing standards for open wood burning fireplaces and an emissions baseline. This work is still at least 1 year from review at USEPA. Possible options to meet new standards include adding a catalyst at the bottom of the vent or putting doors on a unit.		PM reduced, improved indoor/outdoor air quality	

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

	Implementation					
Other Comments	**General**	**Environmental Justice/Social**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Not all municipalities require permits, certificate of occupancy, in a home inspection for all work done in a home.	Existing requirements would only address new and replacements which all require local permits. The code requirement would not cover existing equipment. If NJDCA did adopt USEPA standards, they would have to be approved by the Uniform Advisory Board.					Yes
USEPA not expected to change standards any time soon. Also, may not be adding other types of sources. See training for home installers of wood stoves and fireplace inserts (N9).	Standard options include: (1) changing the UIC code, with the possibility of modeling the strategy after New Jersey's stormwater program or (2) Reference National Fire Protection Association (NFPA) 211 standards, Chapter 11, which could be adopted as local code (ANJEC (voluntary) or rule (mandatory). The standards suggest annual checking of system on an annual basis and a more intensive clean-out of the unit.		Washington and Colorado have implemented state standards more stringent than federal standards.	Large homeowner issue and resistance should be expected. Education is key to gain support from homeowners.		Yes

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
N9	All licensed contractors and manufacturers should be trained to comply with the current standards. NJDCA does not currently require a license for installing a woodstove or fireplace insert.	Residential Wood Combustion: New and existing wood stoves and fireplaces	National Fireplace Institute (NFI) has a training program for proper installation and operation of new and existing fireplaces.		PM reduced, improved indoor/outdoor air quality, reduced carbon monoxide inside the home, burning properly, and preventing house fires.	

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

	Implementation					
Other Comments	**General**	**Environmental Justice/Social**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
This should be required regardless based on safety reasons (i.e., moving gas logs puts public at risk and having unlicensed people install units is risky so the public needs to be educated). What about homeowners that are the licensed contractors, engineers? Permits would still be required and ensured by the code officials; would be caught by the sale of the property. By requiring training, the level of knowledge is being raised above the general level.	As of January 2006, all Home Improvement Contractors operating in New Jersey will be required to register with NJDCA. The registration process could be used to educate this group about compliance with the federal standards.	Low	No existing authority to require training course attendance.	Other states already requiring (Idaho and Rhode Island).		Yes

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
N10	NJDEP should adopt standards that are more stringent than the federal standards under 40 CFR 60 (Subpart AAA) and then adopt into NJDCA code	Residential Wood Combustion: Wood burning units in new construction	The states of Oregon and Washington have lower standards than the USEPA and most manufacturers meet the standards.	Low if the new New Jersey standard is the same as the Washington/Oregon standards for those manufacturers that already meet the Washington/Oregon standards.	PM reduced, improved indoor/outdoor air quality.	What manufacturers do not meet the WA standard and are they in or sell in New Jersey? Indications are that most manufacturers already meet the Washington/Oregon standards.
N11	All manufactured fireplaces must achieve an oxygen to fuel ratio better than the current exemption. (USEPA exemption due to > 35:1 oxygen:fuel combustion ratio). This would capture units that are exempt under the federal standards.	Residential Wood Combustion: New fireplaces	Wood burning fireplace doors are not airtight and should be opened during a fire but there is no control of the air to fuel combustion ratio. The fireplace insert, a stove placed in a fireplace, does control the air:fuel mixture. Direct vent gas fireplaces have airtight doors.		PM reduced, improved indoor/outdoor air quality	Number and types of units currently exempt because of the 35:1 air to fuel ratio.

Table 1. Tracking Suggestions for Future Air Pollution Controls - Indoor Wood Burning (N)

	Implementation					
Other Comments	**General**	**Environmental Justice/Social**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
The environmental benefit may be negligible if all manufacturers currently meet the more stringent standards.	Washington and Colorado have implemented state standards more stringent than federal standards.	Low	Existing law should be adequate to set state standards.	Low		Yes
May not be a large issue as most, if not all, units are covered by the USEPA regulations. Technical feasibility of standard may be complex.		Low	Existing law should be adequate to set state standards.	Low		No

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O1	Expand existing restrictions on prescribed burning/open burning permits to include additional emission reduction measures (e.g., Limit size of burn, local municipal code): See detailed suggestions below	Open Burning, Prescribed Burning (2.6), Residential Wood Combustion outdoor			PM reduced, improved indoor/outdoor air quality	
O2	N.J.A.C. 7:27 Subchapter 2: Expand permit conditions to prohibit burning on high ozone days.	Open Burning, Prescribed Burning (2.6)		Low	PM reduced, improved outdoor air quality	
O3	N.J.A.C. 7:27 Subchapter 2: Remove items that can be commercially sold and/or recycled prior to the open burning. Require through rule and permit conditions.	Open Burning, Prescribed Burning (2.6)		Low	PM reduced, improved outdoor air quality	

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
General comment on what could be done.						Yes - See other specific details
The open burning of plant materials on farms is doing well and there is no need for modifying it.		None	Can do using existing authority of the Air Pollution Control Act			Yes - Being implemented now
The open burning of plant materials on farms is doing well and there is no need for modifying it.		None	Can do using existing authority of the Air Pollution Control Act			Yes

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O4	NJAC 7:27 Subchapter 2, Infested plant life (N.J.A.C. 7:27-2.5), Herbaceous plant life and hedgerows (N.J.A.C. 7:27-2.9), Orchard prunings and cullings (N.J.A.C. 7:27-2.10), and Land clearing (N.J.A.C. 7:27-2.11): Impose new restrictions on issuance of open burning permits: Restrict issuance for all but expressly authorize activities: (1) Limit to farmers who are farmland/forest assessment eligible (>5 acres) (2) Specify that only not-for-profit agencies may apply for permits (3) Limit to address severe infestation only as determined by accepted silvicultural practices and/or best management practices (4) Prescribed burning	Open Burning, Prescribed Burning (2.6)		May affect small lawn and garden businesses, greenhouses, and developers.	PM reduced, improved outdoor air quality	
O5	N.J.A.C. 7:27-2.9 Herbaceous plant life and hedgerows and 7:27-2.11 Land clearing: Limit to maximize agriculture production (for defined period of time/prohibition of alternate use for specific period of time) (1) Open burning should not be okay for developments - limit where this provision could be used to agricultural lands only (2) No clearing of mature trees (specific diameter?) (enforcement issue)	Open Burning	Possible		PM reduced, improved outdoor air quality	

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
The open burning of plant materials on farms is doing well and there is no need for modifying it.			Need changes to Subchapter 2			Yes
The open burning of plant materials on farms is doing well and there is no need for modifying it.					Issue: Preventing clearing of mature trees and how do we enforce	Yes

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O6	N.J.A.C. 7:27-2.10 Orchard prunings and cullings: (1) Promote recycling, financial incentives for alternate methods. (2) Department of Agriculture should duplicate agricultural Best Manufacturing Practices (BMP) for reuse of material that would otherwise be burned (applicable to farming and landscaping, too)	Open Burning	The Department of Agriculture uses the fact sheets and advisories from the Rutgers extension Service. There is a CD containing all the fact sheets in one volume and they are also available online at the Extension website.		PM reduced, improved outdoor air quality	
O7	N.J.A.C. 7:27-2.12 Special permit: Restrict by size, when, (e.g., high ozone days, etc.), fuel source (1) Limit # of special permits or for amount of burning: issued by household, county, region/# of acres in a given time period (Permits already have limits on when they can burn) (2) Ban open burning during the summer months except for emergency/prescribed burning (e.g., May - Sept.)	Open Burning	Possible. The Department of Agriculture uses the fact sheets and advisories from the Rutgers extension Service. There is a CD containing all the fact sheets in one volume and they are also available online at the Extension website.		PM reduced, improved outdoor air quality	

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
The open burning of plant materials on farms is doing well and there is no need for modifying it.						Yes
This idea is not intended to exclude campfires but prevent fires on high ozone days, which usually coincides with days that have a high risk of fire when fires are not allowed in parks and state forests. The open burning of plant materials on farms is doing well and there is no need for modifying it.						Yes

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O8	N.J.A.C. 7:27-2.13 Fees (and fines): (1) Increase fees for permits and enforcement fines as a disincentive for open burning. (2) Correlate the fee to the cost of analysis and processing.	Open Burning			PM reduced, improved outdoor air quality	
O9	Expand Subchapter 5 to address residential emissions of $PM_{2.5}$ and include retrofit requirements for outdoor wood burning equipment in Subchapter 4(?).	Residential Wood Combustion (outdoor)	Technology for outdoor wood boilers is not clearly understood. Currently no controls are on these units. An ASTM task group exists involving NESCAUM, MI, MN, and WI on outdoor wood boilers. There is research in new designs for fire chambers that could lead to standards in the future.	Con: Wood is cheaper: Sales are increasing as the price of oil and energy increase and taking action now is recommended.	PM reduced, improved indoor/outdoor air quality. Existing outdoor wood boilers have incomplete combustion.	
O10	Education to towns about outdoor wood burning appliances and cover existing zoning regulations (extension/addition to ID# B3)	Residential Wood Combustion (outdoor)			PM reduced, improved indoor/outdoor air quality	

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
The open burning of plant materials on farms is doing well and there is no need for modifying it.			Existing. Section 7:27-2.13 does not cover fines.		No issues	Yes
			The State Air Pollution Control Act exempts one and two family residences			No

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O11	Regulate fuel source to ensure that only clean, untreated wood is burned in outdoor appliances	All outdoor wood burning appliances			PM reduced, improved indoor/outdoor air quality. Existing outdoor wood boilers have incomplete combustion.	

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
			Existing regulations cover burning of waste materials in a home environment.			

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O12	Require equipment standards, such as New Source Performance Standards, for outdoor equipment	All outdoor wood burning appliances	Technology for outdoor wood boilers is not clearly understood. Currently no controls are on these units. An ASTM task group exists involving NESCAUM, MI, MN, and WI on outdoor wood boilers. There is research in new designs for fire chambers that could lead to standards in the future. There are 15 manufacturers nationally, which would probably be reduced once regulations are in place.	Con: Wood is cheaper: Sales are increasing as the price of oil and energy increase and taking action now is recommended.	PM reduced, improved indoor/outdoor air quality. Existing outdoor wood boilers have incomplete combustion.	Known emissions, emission factors for outdoor wood boilers

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Industry understands the need to develop a protocol for measuring efficiency of the units and creating standards. Subsequent to the 7/27/05 meeting, a petition to the USEPA administration was developed by many states, including New Jersey, asking for the USEPA to develop national standards for outdoor wood boilers.	There are no current plans to revise the standard to include outdoor wood boilers or other outdoor equipment (though USEPA has been doing some fact finding -i.e. recently met with industry to discuss control of emissions from outdoor wood boilers).		NJDEP has the authority to set standards for this type of equipment	To date, outdoor wood boilers have not been raised as a significant issue (safety, fire, odor/nuisance) by NJ residents probably due to the low numbers of the units in the State.		Yes

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O13	Potential standards for outdoor wood boilers should be developed by a regional agency or by the USEPA.	Outdoor wood boilers	An ASTM task group exists involving NESCAUM, MI, MN, and WI on outdoor wood boilers. There are 15 manufacturers nationally, which would probably be reduced once regulations are in place.	Con: Wood is cheaper: Sales are increasing as the price of oil and energy increase and taking action now is recommended.	PM reduced, improved indoor/outdoor air quality. Existing outdoor wood boilers have incomplete combustion.	Known emissions, emission factors for outdoor wood boilers

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Industry understands the need to develop a protocol for measuring efficiency of the units and creating standards. Subsequent to the 7/27/05 meeting, a petition to the USEPA administration was developed by many states, including New Jersey, asking for the USEPA to develop national standards for outdoor wood boilers.	There are no current plans to revise the standard in include outdoor wood boilers or other outdoor equipment (though USEPA has been doing some fact finding -i.e. recently met with industry to discuss control of emissions from outdoor wood boilers).		NJDEP currently has the authority to establish standards for new equipment.	To date, outdoor wood boilers have not been raised as a significant issue (safety, fire, odor/nuisance) by NJ residents probably due to the low numbers of the units in the State.		Yes

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O14	Allow local zoning ordinance that bans or requires permits for outdoor wood burning in certain densities/types of development or within certain feet from the property line, including educational material that can and cannot be burned and regulatory requirements in a pamphlet in the sale of the unit (i.e., manufacturer warranty restrictions and “best burn practices” plus state regulations)	All outdoor wood burning appliances	If outdoor wood boilers are banned, there will be no investment/incentive to develop new technologies. No controls are on existing units and controls are two years away from being added to new units.	To ban these units would require the residents to replace a heating system and this may be very costly. Con: Wood is cheaper: Sales are increasing as the price of oil and energy increase and taking action now is recommended.	PM reduced, improved indoor/outdoor air quality. Existing outdoor wood boilers have incomplete combustion. Outdoor wood boilers are combustion units and can burn anything.	

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Connecticut passed legislation to allow for new outdoor wood boilers to be located a certain distance from the property line and with a minimum stack height. Outdoor wood boilers are a small segment of the heating system population.	Some counties already ban these units locally. Implement local restrictions on what can be burned in outdoor wood burning practices.	Low income households? To ban these units in existing homes may require the residents to replace a heating system and this may be very costly.	The New Jersey Department of Community Affairs (NJDCA) could adopt the standards into their codes if the standards are federally recognized, ASTM standards, or included in legislation. Permits for outdoor wood boilers would be required in New Jersey.	Potential reduction in neighbor-to-neighbor complaints.	Some counties already ban these units locally.	Yes

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O15	Permits: Include provisions on minimum chimney height and distance to houses/property lines where a new outdoor wood boiler could be sited on a residential property; grandfather units until the sale of the property and regulate the fuel source. Upon issuance of a permit, information regarding regulations and requirements would be included (i.e., manufacturer warranty restrictions and “best burn practices” plus state regulations)	Outdoor wood boilers		Con: Wood is cheaper: Sales are increasing as the price of oil and energy increase and taking action now is recommended.	PM reduced, improved indoor/outdoor air quality. Existing outdoor wood boilers have incomplete combustion.	

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Subsequent to the 7/27/05 meeting, information was provided to NJDEP about Connecticut's approach to outdoor wood boilers. Recent legislation limits the size of the property and the distance to property line upon which an outdoor wood boiler could be placed. This 'stopgap' legislation was passed as an interim control measure until standards could be developed for outdoor wood boiler emissions. Outdoor wood boilers are a small segment of the heating system population	Connecticut recently passed legislation on this that included prospective, not retrospective provisions.	Lower income residences would not have the option of using wood to heat their homes as they are usually on smaller lot sizes.	Permits for outdoor wood boilers would be required in New Jersey	Potential reduction in neighbor-to-neighbor complaints. To date, outdoor wood boilers have not been raised as a significant issue (safety, fire, odor/nuisance) by NJ residents probably due to the low numbers of the units in the State.		Yes

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
O16	a) Ban outdoor wood boilers within New Jersey (new installations) and ban future sales of current units b) Counties to restrict/ban units based on health concerns	Outdoor wood boilers	Putting a ban on the units places a hinderance on the manufacturers' progress of producing more efficient units because the ban would take away the product that provides the industry with a profit. There are 15 manufacturers nationally, which would probably be reduced once regulations are in place.	The changeover to a different system would be costly for the homeowner	**Pros:** PM reduced, improved indoor/outdoor air quality. Existing outdoor wood boilers have incomplete combustion. **Cons:** Prohibiting outdoor wood boilers removes a heating option based on a potential renewable energy source	Number of outdoor wood boilers in New Jersey and the emissions from these units (growing due to the energy crisis)
O17	Regulate sources that are not regulated by Subchapter 2 like residential fire pits	Nonregulated sources of outdoor wood burning	Depends on source targeted	Depends on source targeted	Depends on source targeted; in general, improved outdoor air quality	Relevant sources and their specifications
O18	Expand the scope of subchapter 2 to delete the exemption for a stack or chimney by changing the definition of open burning	Outdoor wood burning	N/A	Not determined	PM reduced, improved indoor/outdoor air quality	Consequences of changing the definition of open burning

Table 2. Tracking Suggestions for Future Air Pollution Controls - Outdoor Wood Burning (O)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Advertisements in magazines for outdoor wood boilers	Can grandfather existing units	Low income households may be dependent on wood heat; mandate is acceptable if a rebate program is offered	Existing. May also violate Interstate Transport of Commerce Laws.	Low - the actual number of outdoor wood boilers seems to be low in New Jersey		No
Prevents overregulation of sources. The open burning of plant materials on farms is doing well and there is no need for modifying it.	Depends on source targeted	Depends on source targeted	Depends on source targeted	Acceptable to those who feel overregulated	Depends on source targeted	No
Beyond the scope of the workgroup to determine the consequences of changing the definition of open burning			Subchapters 4 and 11 were implemented to control stack emissions.		Not determined	No

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
B1	Seasonal restrictions for wood burning - Weather / air quality-related restrictions (e.g., high fire-risk restrictions on campfires; drought restrictions on water use)	Residential Wood Combustion (indoor/outdoor), Open Burning			PM reduced, improved indoor/outdoor air quality	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Not all high PM days occur in the summer but occur at anytime during the year	Precedent already exists in restrictions on campfires during high-fire risk days and restrictions on lawn watering during severe drought emergencies			May restrict pleasure activities like campfires		No?

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
B2	Statewide Education and Outreach campaign: Regarding the health and environmental benefits of compliance and/or participation, operation and maintenance to reduce emissions from residential wood burning, including promotion of improved air quality; also, include brochures distributed with any purchase of wood-burning equipment sold in the State and when selling a home on proper maintenance and operation of wood burning units.	Open Burning, Residential Wood Combustion: New and existing wood stoves and fireplaces	Model after New Jersey's nonpoint source/storm water campaign since it is a similar effort with similar goals (www.cleanwater.org). An example of an outreach effort was the municipality newsletters with simple fact sheets about stormwater and what citizens should and should not do to reduce stormwater pollution.		PM reduced, improved indoor/outdoor air quality	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Use references (EPA, HPBA, Environment Canada) to assemble information into public education/outreach materials. Manufacturers of wood burning units should include maintenance instructions with the wood stove and the installers should inform the homeowner about care and maintenance of a wood stove for fire safety and environmental reasons.	Higher compliance			More involvement. Maintaining a wood stove would need to be part of the education campaign		Yes

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
B3	Investigate an Education and Outreach program using traditional (e.g., newspapers - local and major, radio, TV, websites, letters to the editor, fact sheets, Public Service Announcements (PSAs)) and non-traditional avenues and partners: (1) Daycare centers, schools (PTA/PTO), hospitals, community centers, scouting organizations, and restaurants (2) Use LINCS epidemiologist to evaluate and correlate data on air quality to wood burning	Residential Wood Combustion (indoor/outdoor)	Website: Automatic notifications are not technically feasible yet	Website: Cost is an issue for automatic notifications.	PM reduced, improved indoor/outdoor air quality	
B4	Require an overall standard (see ID# O12 and O13) and promote a daily advisory for "no burn days"	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
If a website is utilized, the pathway should be clear to average citizens and they should be automatically notified with updates and/or concerns, e.g., Ozone Alert Days.	Con: Announcements could be promoting or marketing the appliances, thereby increasing usage and emissions.	Low				Yes
	Include two levels of equipment that is restricted in accordance with the Air Quality Index (AQI) levels so that buying an EPA-certified wood stove is encouraged. Other exemptions could be built in.			CO, AZ, WA, and CA do this - precedent establishe d. . Maintainin g a wood stove would need to be part of the education campaign	Enforced by the visible smoke produced from wood burning in non-certified wood stoves, as EPA-certified wood stoves do not produce visible smoke. If an EPA-certified stove goes bad, the wood stove will produce visible smoke.	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
B5	Better define and distinguish in the regulations burning for home heating (e.g., wood stove/fireplace) vs. ornamental burning (e.g., chimeneas) vs. Subchapter 2 burning (e.g., burning by permit)	Residential Wood Combustion (indoor/outdoor), Open Burning			PM reduced, improved indoor/outdoor air quality	
B6	NJDEP to recommend wood types and home heating fuel sources that burn “clean” (e.g., public education).	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
A clearer understanding of the different types of wood burning would better communicate when and where wood burning would be acceptable.						Handled by implementing a public education campaign
Manufacturers include maintenance instructions with the wood stove and the installers inform the homeowner about care and maintenance of a wood stove for fire safety reasons.	Maintaining a wood stove would need to be part of the education campaign					Yes

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
B7	Enforcement of residential wood smoke nuisance complaints - State Health Department to determine if appropriate materials are being burned (e.g. untreated firewood rather than household or commercial waste material) - no local enforcement	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality. Not compliance related (i.e., nuisance) and would not result in much reductions for SIP purposes.	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
						No

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
B8	Enforcement of residential wood smoke nuisance complaints by Local or County Health Departments (not the State)	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality. Not compliance related (i.e., nuisance) and would not result in much reductions for SIP purposes.	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Engage ANJEC	Currently, the county health departments provide what they are authorized to enforce upon inspection, who are authorized to enforce state air regulations under NJDEP.		Local health departments under the health codes may have the authority to enforce nuisance complaints. But a 1995 amendment to the New Jersey Air Pollution Control Act does not allow local governments from creating an ordinance to restrict wood burning in their communities. This specific provision should be added to the State law.			Yes

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
B9	Enforcement of residential wood smoke nuisance complaints by Local Police Department	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality. Not compliance related (i.e., nuisance) and would not result in much reductions for SIP purposes.	
B10	Enforcement of residential wood smoke nuisance complaints - Municipal ordinance (individual)	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality. Not compliance related (i.e., nuisance) and would not result in much reductions for SIP purposes.	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Engage ANJEC	The New Jersey Air Pollution Prevention Act states that local governments are preempted from passing new ordinances for air pollution control.		See B8			Suggest to implement with B8 so local governments have descretion of who can enforce.
Engage ANJEC	The New Jersey Air Pollution Prevention Act states that local governments are preempted from passing new ordinances for air pollution control.		Local health departments under the health codes may have the authority to enforce nuisance complaints. Also, see B8		Local health departments under the health codes may have the authority to enforce nuisance complaints.	See B8

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
B11	Enforcement of residential wood smoke nuisance complaints - Municipal ordinance (uniform statewide)	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality. Not compliance related (i.e., nuisance) and would not result in much reductions for SIP purposes.	
B12	Amend the New Jersey Air Pollution Control Act to allow for local bans on outdoor wood burning at the municipal level and to provide the authority to require homeowners to upgrade their wood stove or fireplace or outdoor wood burning equipment to resolve an odor, smoke, and/or particulate complaint.	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality	How smokers/smokehouses fit into addressing outdoor wood burning.
B13	An all health department/all NJDEP hotline	Residential Wood Combustion (outdoor)			PM reduced, improved indoor/outdoor air quality	
B14	Health departments notify NJDEP regarding complaints and NJDEP will track and evaluate data. The data will be used to support local action under nuisance codes.	Residential Wood Combustion (indoor/outdoor)			PM reduced, improved indoor/outdoor air quality	

Table 3. Tracking Suggestions for Future Air Pollution Controls - Indoor/Outdoor Wood Burning (B)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Engage ANJEC	The New Jersey Air Pollution Prevention Act states that local governments are preempted from passing new ordinances for air pollution control.		Local health departments under the health codes may have the authority to enforce nuisance complaints. Also, see B8		Local health departments under the health codes may have the authority to enforce nuisance complaints.	See B8
Not addressing BBQs/grills.	Con: Could potentially lead to more changes that were unsolicited and requires support to pass.			Requires legislative and governor support to pass new legislation		Yes
NJDEP currently operates a 24-hour hotline		N/A	N/A	N/A	N/A	No
Can be specifically added to CEHA agreements.		N/A	N/A	N/A	N/A	No

Table 4. Tracking Suggestions for Future Air Pollution Controls - Restaurants (R)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects
R1	Retrofit any equipment that currently does not have retrofit technology; custom-make technologies for any equipment is currently available.	Restaurants	Depends on source targeted	Depends on source targeted but can be high	90% reduction in air emissions; improved outdoor/indoor air quality

Table 4. Tracking Suggestions for Future Air Pollution Controls - Restaurants (R)

		Implementation					
Missing Data	**Other Comments**	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Restaurant equipment types that do not have retrofits that need them							

Table 4. Tracking Suggestions for Future Air Pollution Controls - Restaurants (R)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects
R2	Adopt California standards further investigating regulations and controls applied in California for applicability in New Jersey taking into consideration the regional differences (e.g., # of charbroilers = same impact?) between New Jersey and Southern California while investigating the scientific studies used to support the standards; the economical impacts; social impacts; differences in cooking methods; and the proximity of restaurants to highly populated residential areas.	Restaurants	Burger Kings in California already added controls. Investigate further: Smog Hog, HEPA filters, retrofits: metallic foil surface catalysts, bag filters/wash system, Holton Pure Air System, LCSystems, 2-stage filter removal, and other new technologies. Filters - 70% removal efficiency, simple to clean and maintain. Catalysts are not available for underfired broilers but this can be investigated but are available for upright broilers and would be a new purchase.	Refer to California's staff reports on cost-effectiveness and look into new data. Depending on control used, costs can range $1000/unit - $20,000/system. Total cost to the restaurant industry in NJ: $440 million ($20,000/system x 22,000 restaurants)	**Pros:** VOCs and PM reduced; visibility improved (reduces smoke); improved outdoor/indoor air quality. 1 uncontrolled charbroiler = 16,000 miles driven by a car. Most emissions come from charbroiling (240 burgers from 1 restaurant is like 3 cars/day, which would be like removing 1000 cars/year). Natural gas savings. **Cons:** Potential increased energy demand (electricity); volume of chemicals and amount of trash (solid waste generation) would increase due to increased filter usage. California standards focus on NO not PM. No significant air emission reductions.

Table 4. Tracking Suggestions for Future Air Pollution Controls - Restaurants (R)

		Implementation					
Missing Data	**Other Comments**	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
New data on: restaurant technology, NJ and CA regional differences, economical impacts, social impacts, differences in cooking methods, proximity of restaurants to highly populated residential areas	Consider looking into cooking processes and not just cooking equipment as the air emissions can be different. During the regulatory process, do not assume that California is the best model for New Jersey. The current technology and costs do not support regulatory action for the category because the air emission reductions would not be significant to justify the costs to the industry.	Standards already implemented in California. A recent American National Standards Institute (ANSI) standard could be referenced that was funded by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).	Low	Existing authority under State Air Pollution Control Act		Could be done through CEHA or local health departments	Yes

Table 4. Tracking Suggestions for Future Air Pollution Controls - Restaurants (R)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects
R3	Go beyond California standards (i.e., include other sources such as fat fryers): Adding controls for existing restaurant equipment should be investigated further taking into account the regional differences between New Jersey and Southern California while investigating the scientific studies used to support California's standards; the economical impacts; social impacts; differences in cooking methods; and the proximity of restaurants to highly populated residential areas, in addition to electricity demands and the potential for environmental benefit offsets.	Restaurants	Need to investigate further. Suggestions: Smog Hog, HEPA filters, retrofits: metallic foil surface catalysts, bag filters/wash system, Holton Pure Air System, LCSystems, 2-stage filter removal, and other new technologies. Catalysts are not available for underfired broilers but this can be investigated but are available for upright broilers and would be a new purchase.	HEPA filters ($250), maintenance costs: variable, e.g., $1000-1500/unit for 1-3 yrs. and low cost to change thereafter; odor controls: variable: $12-20,000/unit for initial hardware. Total cost to the restaurant industry in NJ: $440 million ($20,000/system x 22,000 restaurants)	**Pros:** VOCs and PM reduced; visibility improved (reduces smoke); improved outdoor/indoor air quality. 1 uncontrolled charbroiler = 16,000 miles driven by a car. Most emissions come from charbroiling (240 burgers from 1 restaurant is like 3 cars/day, which would be like removing 1000 cars/year). Natural gas savings. **Cons:** Potential increased energy demand (electricity); volume of chemicals and amount of trash (solid waste generation) would increase due to increased filter usage. California standards focus on NO not PM. No significant air emission reductions.

Table 4. Tracking Suggestions for Future Air Pollution Controls - Restaurants (R)

		Implementation					
Missing Data	**Other Comments**	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
New data on: restaurant technology, NJ and CA regional differences, economical impacts, social impacts, differences in cooking methods, proximity of restaurants to highly populated residential areas	Consider looking into cooking processes and not just cooking equipment as the air emissions can be different. During the regulatory process, do not assume that California is the best model for New Jersey. The current technology and costs do not support regulatory action for the category because the air emission reductions would not be significant to justify the costs to the industry.	Standards already implemented in California. A recent American National Standards Institute (ANSI) standard could be referenced that was funded by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).	Low	Existing authority under State Air Pollution Control Act		Could be done through CEHA or local health departments	Yes

Table 4. Tracking Suggestions for Future Air Pollution Controls - Restaurants (R)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects
R4	Further investigate New Jersey restaurant emissions to try to improve quantification methods for more accurate air emissions from restaurants based on other types of cooking methods (i.e., taxation data, restaurant data sent to the Department of Health and Human Services)	Restaurants	Data supplied by existing organizations	Economic data provided by the National Restaurant Association: $10.4 billion in sales from eating and drinking places in New Jersey for 2005; 2005 estimated employment in eating and drinking places: 282,800	Better data could support a more targeted control approach
R5	Further investigate N.J.A.C. 7:27 - Subchapter 11 – Incinerators: stack heights or other technology contained within the regulation for applicability to restaurant controls.	Restaurants	Investigate potential technical applicability		Reduces local ambient air pollution
R6	Further investigate controls for small bread baking restaurants	Restaurants	Controls exist for large bakeries		VOCs, greenhouse gases reduced, improved outdoor/indoor air quality

Table 4. Tracking Suggestions for Future Air Pollution Controls - Restaurants (R)

		Implementation					
Missing Data	**Other Comments**	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Quantity, types, and locations of restaurants; temporal factors	1) Numbers from the National Restaurant Association (NRA): about 22,000 (22,388 using 2003 estimates) eating & drinking establishments in New Jersey. This number would need to be broken down further since it includes 5000 in-house caterers. 2) Should be done through a regulatory process.						Yes
	Subchapter 11 - Incinerators seems not to apply to restaurants						
		Apply same type of requirements for these restaurants similar to large bakeries				Subchapter 8, 16 (?)	

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
Z1	Work with NESCAUM to develop a Memorandum of Understanding (MOU) for a regional sulfur in fuel oil standard that addresses capacity, supply, distribution, and timing concerns of the refineries.	Home heating oil	See NESCAUM report. Refineries in Northeast cannot always accomplish low standards due to their limitation on the types of crude oil they produce.	See NESCAUM report	See NESCAUM report; standard needs to be implemented regionally for any impact on NJ; improved outdoor/indoor air quality; can reduce over 6,000 tpy of SO_2 emissions	

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
	A standard needs to be implemented regionally for the greatest impact on New Jersey	Low	Existing regulation covers sulfur levels in fuel	Care needs to be taken in implementing to prevent disruption in home heating oil supplies. Low, given the recent national events (i.e., destruction caused by Hurricane Katrina and the rise in fuel prices).		Yes

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
Z2	Expand existing rebate programs to additional appliances to get more of the public involved with renewable energy and energy efficiency combined with a general public education and outreach effort	Combustion sources within homes and restaurants (commercial businesses)	Could be modeled after the NJDEP's water program.	NJBPU currently has $120-130 million in the program for rebates but many projects. Look into federal grants (e.g., EPA, NOAA) and private funding. An air program may be eligible for Clean Water Act Section 319 funds if a correlation between air and water quality is demonstrated.	Awareness raised = action taken = improved outdoor/indoor air quality	

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Effort needs to be placed on upgrading existing homes (2 million homes in New Jersey). The public education and outreach effort could include Air Pollution Week (or month) with web, intranet, and broadcast tips on things homeowners in particular can do to reduce indoor and outdoor air pollution.	NJBPU has education and outreach about the benefits of their programs. Are enough people being informed about its availability?			Raises public awareness and increases voluntary efforts. Need for a successful program: positive benefits, successful pilot programs that included education and trial/error		Yes

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
Z3	Mandate geothermal or solar energy for new homes and businesses and require equipment upgrades for existing homes and businesses	Combustion sources within homes and restaurants (commercial businesses)	Effective geothermal energy depends on surrounding environment; all aspects need to be investigated before possible implementation. Stockton College in New Jersey runs on geothermal energy, NJDOA solar program for farms. Solar panels do not have to be on the roof: pole-mounted and ground-mounted systems are available.	Economical - saves on electricity bills (can sell energy back to the electric grid). The cost depends on the specific situation.	Improved outdoor/indoor air quality; NO_x, SO_x, CO_2 reduced	

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
Effort needs to be placed on upgrading existing homes (2 million homes in New Jersey)	Group concerned with mandating across the board	Could increase the cost of a new home	Legislation could be needed			No

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
Z4	Require clean energy systems for homes over a certain size	Combustion sources within homes and restaurants (commercial businesses)	Existing efforts are in place for clean energy developments in Camden and Atlantic City. Many homes are built before they are purchased, i.e., model homes and developments	NJBPU rebate programs. The cost depends on the specific situation.	Improved outdoor/indoor air quality; NOx, SOx, CO2 reduced	
Z5	Mandate that builders provide homeowners with clean energy options at the time of construction. Increase marketing, public relations, education, and outreach (e.g., homebuying websites).	Combustion sources within homes	Effective geothermal energy depends on surrounding environment; all aspects need to be investigated before possible implementation. Many homes are built before they are purchased, i.e., model homes and developments leaving the builder to decide if solar or geothermal is to be added.	NJBPU rebate programs. The cost depends on the specific situation.	Improved outdoor/indoor air quality; NO_x, SO_x, CO_2 reduced	The responsible party that would cover potential problems and/or environmental threats with energy efficient systems (some systems, e.g., solar panels, have warranties to cover free replacements).

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
NJBPU caps rebates at a certain size (defined by square footage)	Group concerned with mandating across the board	Could increase the cost of a new home	Legislation could be needed			No
While adding solar/geothermal to a new home will add to its cost, the resale value will be enhanced and the home may be more attractive to the consumer.		Ensure that programs are available for low-income families	Legislation could be needed			Yes

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
Z6	Require that a certain percentage of homes are predesigned with geothermal/clean energy options ready for purchase and are available to low-income families. Require that future system changes must be equal to or better than the energy efficient/clean energy system, in terms of efficiency, while expanding the rebates for the other systems.	Combustion sources within homes	Effective geothermal energy depends on surrounding environment; all aspects need to be investigated before possible implementation. Many homes are built before they are purchased, i.e., model homes and developments leaving the builder to decide if solar or geothermal is to be added.	NJBPU rebate programs. The cost depends on the specific situation. An independent group would need to analyze demographics (costs to implement Z6).Cons: (1) No named buyers for the predesigned energy efficient homes and (2) offsetting the costs of constructing energy efficient homes with the variable nature of home markets. Pro: The demand for energy efficient homes might increase, thereby making energy efficient homes marketable for the homebuilder.	Improved outdoor/indoor air quality; NO_x, SO_x, CO_2 reduced	The responsible party that would cover potential problems and/or environmental threats with energy efficient systems (some systems, e.g., solar panels, have warranties to cover free replacements).
Z7	Instead of mandates, extend existing NJBPU programs to incorporate more benefits for builders. Include outreach to builders about the availability of rebates for energy efficiency/clean energy options.	Combustion sources in new construction of homes and commericial buildings		NJBPU rebate programs. Investigate tax credits .	Improved outdoor/indoor air quality; NO_x, SO_x, CO_2 reduced	

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
While adding solar/geothermal to a new home will add to its cost, the resale value will be enhanced and the home may be more attractive to the consumer.	Only allow for the placement of Energy Star efficient appliances within these developments.	Builders meeting their obligations to provide a certain percentage of affordable housing must also add energy conservation features to these units to make then more affordable for the low-income family.	Legislation could be needed			Yes
						Yes?

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
Z8	Mandate that clean energy systems be required for new commercial and industrial buildings and include maintenance and upgrade specifications for existing buildings. Require that future system changes must be equal to or better than the energy efficient/clean energy system, in terms of efficiency, while expanding the rebates for the other systems.	Combustion sources within commercial and industrial buildings	Design standards already exist in NJDCA codes and in the LEED program. Stockton College in New Jersey runs on geothermal energy, NJDOA solar program for farms	90% of cost is fuels and maintenance – if efficient systems are installed, significant savings are realized. The cost depends on the specific situation.	Improved outdoor/indoor air quality; NO_x, SO_x, CO_2 reduced	The responsible party that would cover potential problems and/or environmental threats with energy efficient systems (some systems, e.g., solar panels, have warranties to cover free replacements).

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
No need to mandate as cost-effectiveness will drive implementation	NJBPU currently has a program for faith institutions to help run the buildings efficiently.		NJDCA has codes for the building designs to comply with the current energy code			Yes

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
Z9	Mandate a program that meets certain standards that are widely accepted by creating minimum standards for all appliances - extend to appliances not covered under existing codes (i.e., see if other types of appliances could also be given an Energy Star rating)	Appliances	Some appliances do have minimum standards in New Jersey; manufacturers cannot make appliances under certain standards and there are tax credits available to meet new standards.	Tax credits available; funding would be a concern. Look into federal grants for rebates	Improved outdoor/indoor air quality	

Table 5. Tracking Suggestions for Future Air Pollution Controls - Other (Z)

	Implementation					
Other Comments	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
		Mandating that only Energy Star applicances can be sold in NJ could result in increased cost of these appliances, which may be cost-prohibitive to low income families.	NJDCA has minimum design standards for some appliances (manufacturers cannot make appliances under certain standards)			Yes

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 4: Suggestions Outside the Scope of the Homes and Restaurants Workgroup

October 31, 2005

The Homes and Restaurants Workgroup Report
October 31, 2005

The table is a summary of the recommendations for further consideration that were determined to be outside of the scope of the Homes and Restaurants Workgroup but that should still be considered by the NJDEP Management. The table is divided into two parts: (1) 'Idea Description' to 'Missing Data' and (2) 'Other Comments' to 'Suggest to Implement.'

Table 1. Suggestions Outside the Scope of the Homes and Restaurants Workgroup

ID #	Idea Description	Emission Source(s)	Tech. Feasibility	Cost	Environmental Effects	Missing Data
R4	Further investigate New Jersey restaurant emissions to try to improve quantification methods for more accurate air emissions from restaurants based on other types of cooking methods (i.e., taxation data, restaurant data sent to the Department of Health and Human Services)	Restaurants	Data supplied by existing organizations	Economic data provided by the National Restaurant Association: $10.4 billion in sales from eating and drinking places in New Jersey for 2005; 2005 estimated employment in eating and drinking places: 282,800	Better data could support a more targeted control approach	Quantity, types, and locations of restaurants; temporal factors
O18	Expand the scope of subchapter 2 to delete the exemption for a stack or chimney by changing the definition of open burning	Outdoor wood burning	N/A	Not determined	PM reduced, improved indoor/outdoor air quality	Consequences of changing the definition of open burning

		Implementation					
ID #	**Other Comments**	**General**	**EJ**	**Authority**	**Social**	**Enforcement**	**Suggest to Implement?**
R4	1) Numbers from the National Restaurant Association (NRA): about 22,000 (22,388 using 2003 estimates) eating & drinking establishments in New Jersey. This number would need to be broken down further since it includes 5000 in-house caterers. 2) Should be done through a regulatory process.						Yes
O18	Beyond the scope of the workgroup to determine the consequences of changing the definition of open burning			Subchapters 4 and 11 were implemented to control stack emissions.		Not determined	No

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 5: Other Attachments

October 31, 2005

Table 1. Other Attachments

Document Name	Author/Organization	Date
Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State	Eliot Spitzer, Attorney General of New York State, Environmental Protection Bureau	August 2005
Petition to EPA by NY, CT, MD, MA, MI, NJ, VT and NESCAUM: *Petition for rulemaking under 42 U.S.C. § 7411(b)(1) regarding Outdoor Wood Boilers*	Eliot Spitzer, Attorney General of New York State, Environmental Protection Bureau, on behalf of CT, MD, MA, MI, NJ, VT and NESCAUM	August 11, 2005
Petition for rulemaking under 42 U.S.C. § 7411(b)(1) regarding Outdoor Wood Boilers	James P. Brooks, Director Bureau of Air Quality, Maine Department of Environmental Protection	September 23, 2005

Smoke Gets in Your Lungs:
Outdoor Wood Boilers in New York State

Eliot Spitzer
Attorney General of New York State
Environmental Protection Bureau
August 2005

Smoke Gets in Your Lungs:
Outdoor Wood Boilers in New York State

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CONTENTS

TABLES AND FIGURES

ACRONYMS USED IN THIS REPORT

ASTM	-	Association for Standards and Testing Materials
BTU	-	British Thermal Unit
CDDs	-	Chlorinated dibenzo-p-dioxins
DEC	-	New York State Department of Environmental Conservation
DOH	-	New York State Department of Health
ECL	-	Environmental Conservation Law
EPA	-	United States Environmental Protection Agency
HPBA	-	Hearth, Patio, and Barbecue Association
NYCRR	-	New York Code of Rules and Regulations
OAG	-	New York State Office of the Attorney General
OWB	-	Outdoor Wood Boiler
PAH	-	Polycyclic Aromatic Hydrocarbon
PCBs	-	Polychlorinated biphenyls
PM	-	Particulate Matter

Executive Summary

Homeowners, especially in rural communities, are increasingly turning to wood burning units installed outside the home, known as outdoor wood boilers (OWBs), to heat their homes. OWB sales have tripled in New York since 1999, with over 7,000 OWBs sold from 1999 to 2004.

The New York State Office of the Attorney General (OAG) Environmental Protection Bureau reviewed information on OWBs and analyzed the manufacture, distribution, testing, and sales of OWBs in New York State. We found that while OWBs are advertised as a clean and economical way to heat one's house and water, OWBs may be among the dirtiest and least economical modes of heating, especially when improperly used. Even when used properly, OWBs emit, on an average per hour basis, about four times as much fine particulate matter pollution as conventional wood stoves, about 12 times as much fine particle pollution as EPA-certified wood stoves, 1000 times more than oil furnaces, and 1800 times more than gas furnaces. Such emissions are significant because fine particulate matter pollution has both short-term and long-term health effects.

Currently, neither federal nor New York State regulations address the proper use of, or limit the pollution from, OWBs. Unlike indoor woodstoves and other heating devices, OWBs do not have to meet safety or performance standards. In the absence of such regulations, some local governments have imposed sensible limits on OWBs, which are described in this report.

We recommend that comprehensive testing protocols and emission limitations be enacted. We also suggest practical steps that owners and neighbors can take to mitigate environmental and health problems associated with OWBs.

I. Introduction: The Increasing Use of OWBs

In the 1980s, as the cost of oil and natural gas rose and as Americans attempted to reduce their heating expenses, the prevalence of residential wood burning stoves and furnaces increased. As of 1998, nine percent of the homes in the United States used residential wood combustion units (including wood stoves, fireplaces, pellet stoves, masonry heaters and wood-fired furnaces) for at least a portion of their heating needs.[1] The United States Environmental Protection Agency (EPA) established emissions standards in 1988 for indoor residential wood stoves in an effort to decrease people's exposure to particulate matter, carbon monoxide, and other pollutants.[2] Consequently, all new residential wood stoves sold in the United States since 1992 require EPA certification and pollution controls.[3] OWBs, however, which were rare in 1988, are not covered by the EPA residential wood stove regulations.

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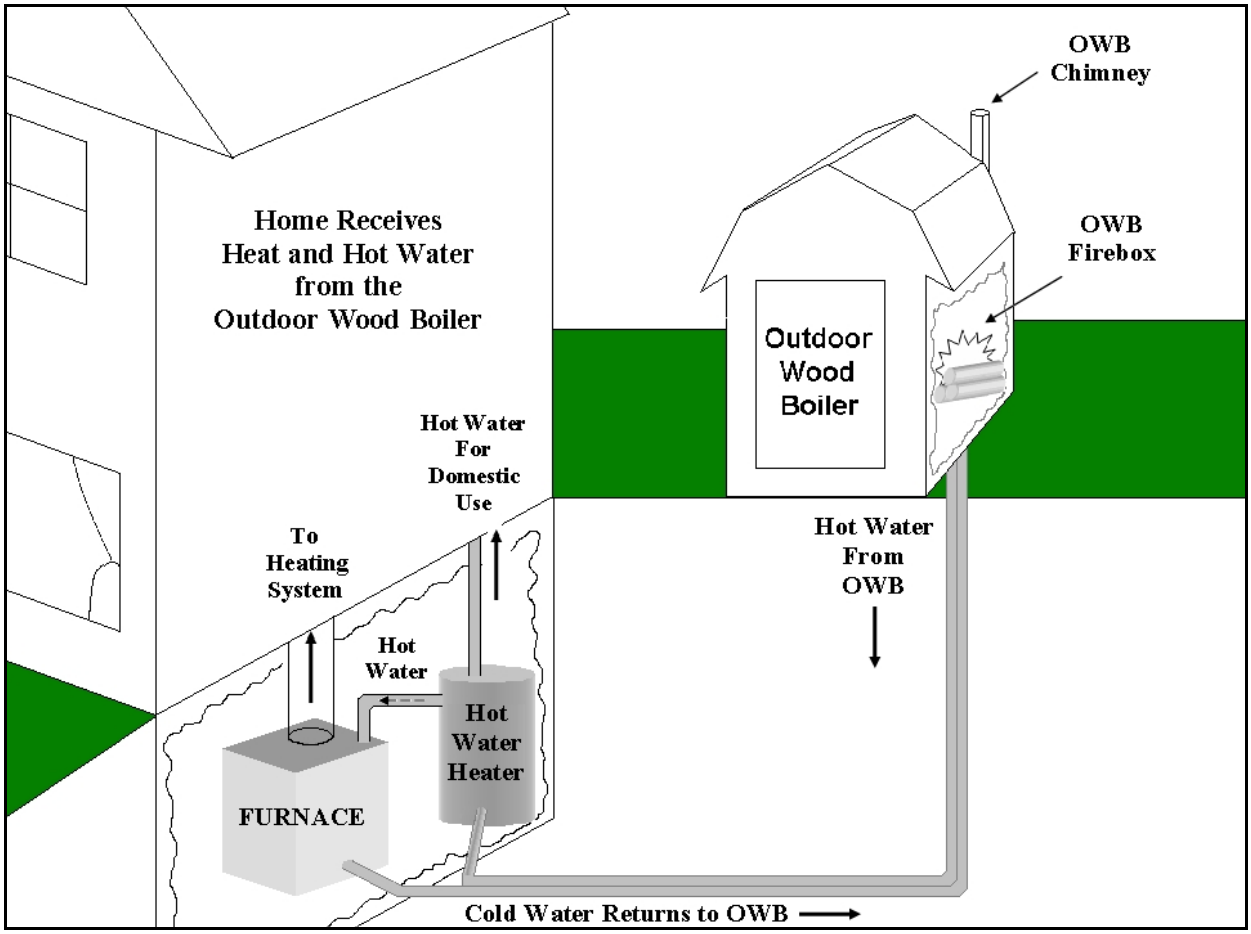
[1] Houck, J., et al., *Air Emissions from Residential Heating: The Wood Heating Option Put into Environmental Perspective,* Proceedings of a U.S. EPA and Air Waste Management Association Conference. Emission Inventory: Living in a Global Environment, V.1, pp. 373-384 (1998).

[2] Standards of Performance for New Residential Wood Heaters, 40 CFR §§ 60.530-60.539b.

[3] A list of EPA approved wood stoves can be found on the EPA website, *available at* www.epa.gov/compliance/resources/publications/monitoring/programs/woodstoves/certifiedwood.pdf (last accessed May 31, 2005).

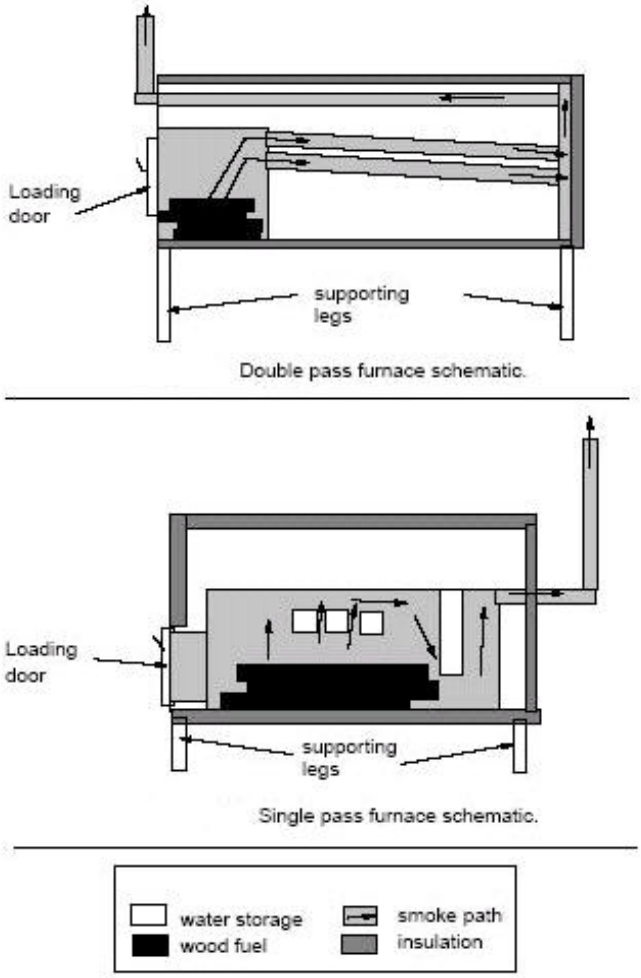
An OWB is a freestanding combustion unit located outside the home or structure to be heated (see Figure 1) that consists of a firebox surrounded by a water reservoir (see Figure 2). While designs vary by manufacturer, a typical OWB resembles a small shed with a short chimney to release combustion gases and an oversized firebox, built to accommodate unsplit logs up to five feet in length. OWBs vary in size, but are typically three to five feet wide, six to nine feet deep, and six to ten feet tall, including the height of the chimney.

Figure 1: Schematic of OWB and Home



OWBs are designed to accommodate large wood loads which can burn for many hours without tending. Wood is placed in the firebox (combustion chamber) by the OWB operator and is ignited. The water in the reservoir surrounding the firebox is heated when hot combustion gases from the firebox pass, via pipes, through the reservoir to the exhaust stack (see Figure 2). The heated water is pumped through insulated underground pipes from the OWB to the home or building where it is circulated through the home's heating system. Wood in the firebox continues to burn until the temperature in the home reaches the desired level. A thermostat in the home controls the burn rate of the fuel by varying the amount of air that is supplied to the firebox for wood combustion. When the thermostat temperature is reached, the firebox is deprived of oxygen, leaving the wood smoldering, until more heat is needed.

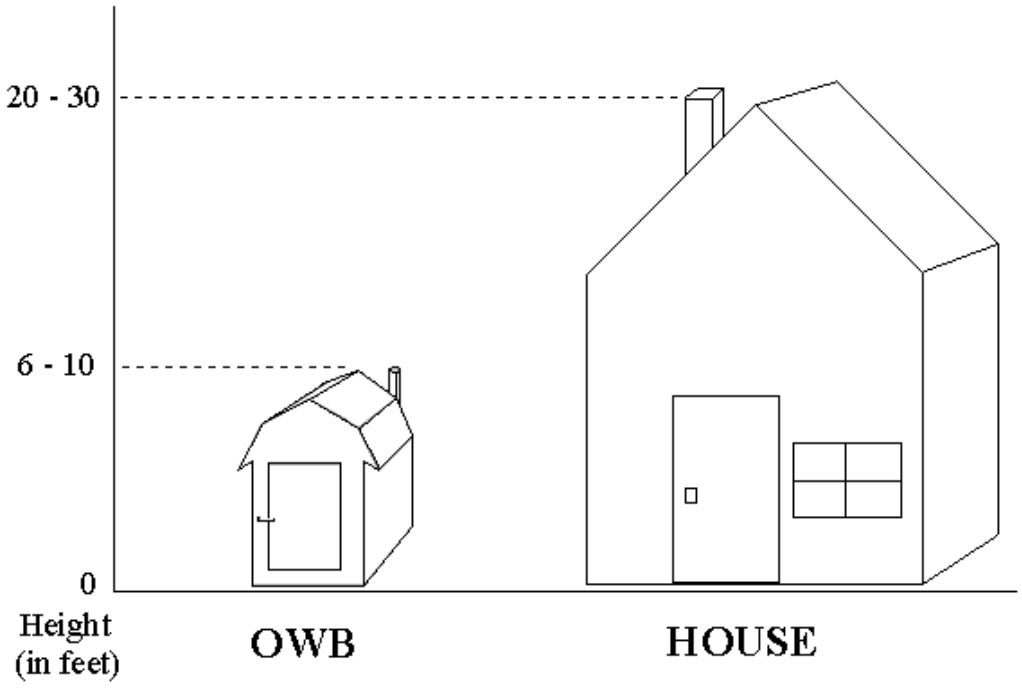
Figure 2: Schematic of Inside OWB [4]



In contrast to indoor wood stoves, which feature chimneys located above the building's roof line, smoke is released from the OWB via a short chimney, typically at a height of approximately six to ten feet (see Figure 3). Chimney extensions are sometimes added to increase the height.

[4] Adapted from Valenti, J. and Clayton, R., *Emissions from Outdoor Wood-Burning Residential Hot Water Furnaces*, EPA-600/R-98-017 (February 1998).

Figure 3: Comparison of Chimney Heights



OWBs are increasingly becoming a primary method of heating homes in winter and providing hot water year-round. The number of OWBs sold annually in New York State has tripled from approximately 600 units in 1999 to 1,880 units in 2004. Sales across the United States have similarly increased, from about 4,800 in 1999 to over 15,000 in 2003. Based on partial data for 2004, it is estimated that 24,500 OWBs were sold across the U.S. in 2004. Since 1999, of the 77,500 units sold nationwide, nearly 7,500 OWBs have been sold in New York State (see Table 1).

Table 1: Number of OWBs Sold in NYS and Nationwide, 1999 to 2004

	1999	2000	2001	2002	2003	2004*	TOTAL
NY State	606	1037	1721	947	1272	1880	7463
U.S.	4828	6865	15330	10552	15340	24560	77475

*Estimated based on partial data for 2004 and assuming continued rate of growth

There are at least 23 manufacturers of OWBs that sell units in the United States (see Appendix E for names and contact information). Manufacturers typically sell OWBs to customers both directly and through more than 300 distributors and local dealers in New York State. One manufacturer accounts for approximately one-third of the United States sales since 1999.

II. OWB Pollution

State health and environmental agencies have received a growing number of complaints from owners and neighbors that OWBs produce thick, acrid, foul smoke that permeates buildings and homes, causing not only a nuisance, but also environmental degradation and health problems. Even when operated using clean seasoned wood, OWBs can emit significant pollution because the basic design of the OWB causes fuel to burn incompletely, or smolder, resulting in thick smoke and high particulate emissions. The problem is aggravated when other materials, such as wet wood, processed wood, and garbage are burned. The short OWB chimney and reduced draft often fail to disperse the smoke, resulting in more concentrated pollution at lower heights reaching residents and neighbors. Exposure to this smoke, like other pollutants, can cause or contribute to short-term health harms such as eye, nose, throat, and lung irritation, coughing and shortness of breath, and may exacerbate asthma or trigger asthma attacks. Chronic exposure to smoke can cause long-term effects such as asthma, heart and lung disease, and cancer.

A. OWB Operation and Smoke

Wood smoke is one of the primary contributors to certain types of air pollution in the United States,[5] especially in rural areas. Even though wood combustion accounts for only about nine percent of the nation's home heating needs, it accounts for an estimated forty-five percent of the total fine particulate matter directly released by all fuel combustion used for residential heating.[6]

To obtain the most efficient – and thus cleanest – burn from a wood combustion device, dry wood should be burned in a manner that allows airflow and oxygen to the greatest amount of surface area. OWBs create smoldering conditions which in turn produce excess smoke. An efficient fire should produce clear exhaust during warmer months, and white exhaust (steam) during colder months. An inefficient fire produces gray, black, or thick smoke and releases much more harmful particulate matter. Because OWBs are designed to respond to the thermostatic setting by smoldering when less heat is required, they produce heavy smoke emissions more often than most other wood combustion devices.

Smoke from OWBs becomes more problematic when the owner burns items other than dry seasoned wood. Burning wet, damp, or green wood reduces the efficiency and heat output of any wood combustion device and increases particulate emissions.[7] The energy that could be released in the form of heat is instead used to boil off the water content of the wood, which in freshly cut, green wood can be as much as fifty percent of the total weight. Thus, to generate the same amount of heat, more wood must be burned, increasing emissions of carbon dioxide – the most important pollutant responsible for global warming. In addition, when energy is expended to change water into steam, the temperature of the fire is decreased leading to incomplete combustion of the wood fuel. When that happens, increased amounts of unburned particulates will be emitted with the steam and combustion gases.[8] Finally, all wood combustion, but particularly incomplete combustion such as in OWBs, produces a variety of toxic

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[5] Fisher, L., et al., *Long-Term Performance of EPA-Certified Phase 2 Woodstoves, Klamath Falls and Portland, Oregon: 1998/1999*, EPA/600/SR-00/100 (2000); McDonald, J., et al., *Fine Particle and Gaseous Emission Rates from Residential Wood Combustion*, Environmental Science and Technology 34(11): 2080-2091(2000).

[6] EPA, *National Air Quality and Emissions Trends Report, 2003 Special Studies Edition*, Office of Air Quality Planning and Standards, EPA 454/R-03-005 (September 2003); Houck, J., et al., *Air Emissions from Residential Heating: The Wood Heating Option Put into Environmental Perspective*, Proceedings of the U.S. EPA and Air Waste Management Association Conference. Emissions Inventory: Living in a Global Environment, V.1, pp. 373-384 (1998). While wood accounts for nine percent of residential heating, fossil fuels – most burned in a home furnace but some burned in a power plant to produce electricity – are used for most US residential heating. Electricity-generating power plants emit the majority of their pollution as gases that are, in part, converted in the atmosphere to fine particles so that their overall contribution to fine particulate pollution in the ambient air is greater than that of wood combustion.

[7] EPA, *Reducing Air Toxics in Your Community*, EPA-453/F-03-001 (October 2004); American Lung Association, *Woodburning* (April 2000).

[8] Burning wet wood will result in creosote build-up inside the firebox and chimney. Creosote is a flammable sticky tar-like substance that is often responsible for chimney fires if it is allowed to accumulate from an initial gray powdery dusting into a thick crystalized build-up. Cleaning the firebox and chimney regularly will increase air flow in the wood heater, thereby reducing the rate of creosote build-up.

emissions including carbon monoxide, formaldehyde, benzene, naphthalene, and polycyclic aromatic hydrocarbons.[9]

When construction materials, packaging crates, and home garbage (which often includes plastics, rubber, batteries, electronics, and other materials unsuited for disposal by backyard combustion) are burned, the emission of harmful pollutants increases.[10] While emissions from OWBs that burn household items have not been studied, studies of backyard burning of garbage have found that emissions include, but are not limited to, carbon monoxide, hydrogen chloride, hydrogen cyanide, benzene, styrene, formaldehyde, arsenic, lead, chromium, benzopyrene, dioxins, furans, and PCBs. According to a study conducted by EPA, the New York State Department of Health (DOH), and the New York State Department of Environmental Conservation (DEC), burning approximately ten pounds of household trash in a burn barrel releases as much air pollution as a modern, well-controlled municipal waste incinerator burning 400,000 pounds of trash.[11]

Although OWBs have not been subjected to extensive testing, limited testing (shown in Table 2 and Appendix A) has indicated that emissions of fine particulate matter (defined as particulates smaller than 2.5 millionths of a meter in diameter, and referred to as PM 2.5) from burning wood in OWBs are about four to 12 times higher than the emissions from indoor woodstoves.[12] Conventional wood stoves manufactured prior to 1992, which were not airtight and had no pollution controls, generated an average of 18.5 grams PM 2.5 per hour, whereas the newer EPA-certified wood stoves averaged about six grams per hour.[13] In similar tests, OWB emissions ranged from 18 to147 grams PM 2.5 per hour and averaged

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[9] Larson, R. and Koenig, J., *Summary of the Emissions Characterization and Noncancer Respiratory Effects of Wood Smoke*, EPA-453/R-93-036 (1993); Washington State Department of Ecology, *Health Effects of Wood Smoke* (March 1997).

[10] Not surprisingly, for this reason the Hearth, Patio, and Barbecue Association advises homeowners to never use the following: trash, plastics, gasoline, rubber, naptha, household garbage, material treated with petroleum products (particle-board, railroad ties, pressure treated wood), leaves, paper products, and cardboard. Hearth, Patio, and Barbecue Association, *Smoke Troubleshooting Checklist for Outdoor Furnaces*, (April 2004), *available at* www.hpba.org/govrelations/troubleshootingGuidlines.pdf (last accessed May 31, 2005).

[11] Lemieux, P., *Project Summary. Evaluation of Emissions from the Open Burning of Household Waste in Barrels (with Errata)*, EPA/600/SR-97/134 (October 2003).

[12] Particulate pollution is typcially measured using EPA Test Method 5 which collects PM as small as 0.3 microns. An additional test can then be used to distinguish between particles larger or smaller than 2.5 microns. Studies have shown that nearly all of the PM emitted in woodsmoke is PM2.5 or smaller. Houck, J., and Tiegs, P., Residential Wood Combustion – PM2.5 Emissions, WESTAR PM2.5 Workshop, Reno, Nevada (July 1998) (93% of the particulate emissions from wood combustion is PM2.5). In its assessment, The Mid-Atlantic Regional Air Management Association assumes that 100 percent of PM emissions from wood combustion is PM2.5 or smaller. See *Technical Memorandum No. 6: MANE-VU Residential Wood Combustion Emission Inventory*, Mid-Atlantic Regional Air Management Association (April 30, 2004).

[13] Valenti, J. and Clayton, R., *Emissions from Outdoor Wood-Burning Residential Hot Water Furnaces* EPA-600/R-98-017 (February 1998). EPA has established emission limits on indoor wood stoves, distinguishing between those with catalysts (through which the smoke passes, causing additional combustion) and those without catalysts. The EPA limits are 4.1 and 7.5 grams PM 2.5 per hour respectively. As can be seen in Table 2, however, testing indicates that many catalytic stoves are not, in fact, meeting the legal limit.

about 72 grams per hour.[14] In comparison to other emission sources, one OWB produces approximately as much PM 2.5 per hour as two heavy duty diesel trucks, 45 passenger cars, 1000 oil furnaces, or 1800 gas furnaces.[15] A comparison of PM 2.5 emissions from various home heating devices is shown in Figure 4. (Coal, while used extensively for electricity production, is not used extensively in New York for home heating.)

Table 2: Comparison of Emissions from Various Wood Combustion Units

Type of Wood Combustion Unit	**Particulate Matter, Average (grams per hour)**	**Polycyclic Aromatic Hydrocarbons, Average (grams per hour)**
OWB	71.6 [ii]	0.96 [ii]
Conventional (non-EPA Certified) Wood Stove [i]	18.5 [iii]	0.36 [iv]
EPA Certified Catalytic Wood Stove [i]	6.2 [iii]	0.15 [iv]
EPA Certified Non-Catalytic Wood Stove [i]	6.0 [iii]	0.14 [iv]
EPA Phase-II Certified Woodstove [v]	4.1: EPA limit for catalytic woodstoves 7.5: EPA limit for non-catalytic woodstoves	Not Available

[i] Assumes 1.0 kg/hr burn rate.
[ii] Appendix A.
[iii] Houck, J. and Tiegs, P., *Residential Wood Combustion Technology Review, Volume 1. Technical Report*, EPA-600/R-98-174a. (1998).
[iv] Fisher, L., et al., *Long-Term Performance of EPA-Certified Phase 2 Woodstoves, Klamath Falls and Portland Oregon: 1998/1999.* EPA-600/SR-00-100 (2000).
[v] Subpart AAA-Standards of Performance for New Residential Wood Heaters, 40 CFR §§ 60.530-60.539b.

[14] These tests were conducted either by EPA or laboratories on behalf of manufacturers. See Appendix A.

[15] OWB, conventional wood stove, and EPA certified wood stove emission rates from Table 2; emission rates of 0.07 g/hr and 0.04 g/hr from *EPA Emission Factors AP-42*, Fifth Edition, Volume I, *available at* www.epa.gov/ttn/chief/ap42/ch01/index.html (last accessed May 31, 2005); EPA, *Emission Standards Reference Guide of Heavy-Duty and Nonroad Engines*, EPA 420-F-97-014 (September, 1997);
EPA, *Federal Certification Exhaust Emission Standards for Light-duty Vehicles (Passenger Cars) and Light-duty Trucks: Federal Test Procedure (FTP), Cold CO, and Highway and Idle Tests*, EPA 420-B-00-001 (February, 2000).

Figure 4: Relative Emissions of Fine Particulate Matter From Home Heating Devices

B. Human Health Impacts of OWB Smoke

Exposure to various components of wood smoke and the contaminants found in wood smoke has been associated with adverse human health impacts, as discussed below. The likelihood of health effects depends on many factors, such as the amount of smoke to which one is exposed, the frequency and duration of exposure, and the sensitivity of the individual exposed.

Fine Particulate Matter (PM 2.5)

Exposure to PM 2.5 can cause short-term health effects such as eye, nose, throat, and lung irritation, coughing, sneezing, runny nose, and shortness of breath and can also affect lung function and worsen medical conditions such as asthma and heart disease. While the upper respiratory system will filter out particles larger than ten millionths of a meter (or microns), PM 2.5 can bypass the body's natural filtering mechanisms to lodge deep in the lungs.[16] Scientific studies have linked increases in daily PM 2.5 exposure with increased respiratory and cardiovascular hospital admissions, emergency department visits and deaths. Recent studies suggest that long-term exposure to PM 2.5 may be associated with increased rates of bronchitis and reduced lung function, and increased cancer risk. People with breathing problems (such as asthma, bronchitis, emphysema, or pneumonia) and/or heart problems, and certain members of

[16] EPA, *EPA Announces Final Designations for First Fine Particulate Standard, Press Release* (Dec. 17, 2004), *available at* www.epa.gov/pmdesignations (last accessed May 31, 2005).

the general population (such as children and the elderly) may be particularly sensitive to PM 2.5.[17] More than 60,000 deaths each year in the United States can be attributed to exposure to air polluted with PM 2.5.[18]

Respiratory and cardiovascular diseases have been associated directly with wood smoke emissions.[19] For example, a Seattle area study noted increases in asthma and other respiratory disease and declines in lung function among children exposed to wood smoke.[20] Long term exposure to wood smoke, like other emissions containing PM 2.5, can lead to chronic bronchitis, obstructive lung disease, and an increased risk of cancer.[21]

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of chemicals that are formed during the incomplete combustion of coal, oil, gas, wood, garbage, and other organic substances such as tobacco. PAHs generally occur as complex mixtures often containing hundreds of different PAHs. Tests on mice show that exposure to PAHs during pregnancy results in higher rates of birth defects, lower birth weights, and difficulty reproducing. Animal studies have also shown that both short-term and long-term exposure to PAHs can inhibit the body's ability to fight disease. Some PAHs have been categorized as probable human carcinogens (cancer causing chemicals) by the U.S. Department of Health and Human Services, and by the International Agency for Research on Cancer.[22]

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[17] New York State Department of Health Fact Sheet, *Fine Particles (PM 2.5) Questions and Answers* (Feb 2003, revised July 2004), *available at* www.health.state.ny.us/nysdoh/indoor/pmq_a.htm (last accessed May 31, 2005).

[18] Washington State Department of Ecology, Air Quality Program, *Health Effects of Wood Smoke* (March 1997, updated August 2004).

[19] Zelikoff, J., et al., *The Toxicology of Inhaled Woodsmoke*, J. Toxicology and Environmental Health, Part B, 5: 269-282 (2002).

[20] Koenig, J., et al., *Pulmonary Function Changes in Children Associated with Fine Particulate Air Pollution*, Environmental Research 63(1): 26-38 (1993); Larson, R. and Koenig, J., *Wood Smoke: Emissions and Noncancer Respiratory Effects.* Annu. Rev. Public Health 15: 133-56 (1994).

[21] American Lung Association, *Wood Smoke Affects Your Health* (1990); Ammann, H., *Summary Overview of Health Effects Associated with Residential Wood Combustion: Health Effects Issue Assessment*, Internal Report, EPA, Research Triangle Park, NC (1986); Larson, T., et al., *Urban Air Toxics Mitigation Study: Phase I*, University of Washington report submitted to the Puget Sound Air Pollution Control Authority (1988); Morris, K., et al., *Wood Burning Stoves and Lower Respiratory Tract Infections in American Indian Children*, American Journal of Diseases of Children 144: 105-108 (1990); Stevens, R., et al., *Sources of Mutagenic Activity in Urban Fine Particles*, Toxicol. Industrial Health 6: 81-94 (1990).

[22] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Polycyclic Aromatic Hydrocarbons* (August 1995).

Carbon Monoxide

At low concentrations, carbon monoxide can cause fatigue in healthy people and chest pain in people with heart disease. At higher concentrations, it can cause impaired vision and coordination, headaches, angina, dizziness, confusion, and nausea. Exposure can cause flu-like symptoms that stop after exposure ends. It can also be fatal at very high concentrations, due to the formation of carboxyhemoglobin in the blood, which inhibits oxygen uptake.[23]

Benzene

Exposure to benzene can cause both short and long term health effects. At high concentrations, exposure to benzene can cause drowsiness, dizziness, rapid heart rate, headaches and tremors. Long term exposure to lower levels are associated with adverse effects in the blood and bone marrow (leukemia), the immune system, the reproductive system, and increased cancer risk.[24]

Chlorinated Dioxins

Chlorinated dibenzo-p-dioxins (CDDs) are a family of 75 different compounds with varying harmful effects. CDDs are released to the environment during combustion of fossil fuels (coal, oil, natural gas) and wood, and during incineration processes. Burning materials that may contain chlorine, such as plastics, wood treated with pentachlorophenol, pesticides, polychlorinated biphenyls (PCBs), and even bleached paper can produce CDDs. Exposure to CDDs generally occurs through breathing contaminated air, or through skin contact with materials containing CDDs. Effects of exposure depend on the amount, but can range from skin disease, changes in blood, urine, and liver chemistry, as well as potential reproductive or developmental effects. Certain CDDs have been determined to be likely carcinogens.[25]

Other Chemicals

Wood smoke contains inorganic and organic irritants such as formaldehyde and other aldehydes, nitrogen oxides and sulfur oxides. Inhalation of wood smoke containing irritants can lead to inflammation and swelling of the lung tissue and can contribute to respiratory distress. Irritants can interfere with the normal flow of mucus that removes particles from the respiratory tract, thereby increasing the amounts of particulate matter entering the lungs. These irritants can also contribute to allergic reactions.[26]

C. Neighborhood Problems Created by OWB Smoke

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[23] EPA, *Indoor Air Quality Tools for Schools Kit,* IAQ Coordinator's Guide**,** *available at* www.epa.gov/iaq/schools/tfs/guidee.html (last accessed May 31, 2005).

[24] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Benzene*, Public Health Statement (September 1997).

[25] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Chlorinated Dibenzo-p-Dioxins*, Public Health Statement (December 1998).

[26] Agency for Toxic Substances and Disease Registry, *TOXFAQs for Formaldehyde* (June 1999), *Sulfur Dioxide* (June 1999), and *Nitrogen Oxide* (April 2002).

During summer months and calm winter days, wood smoke is slow to rise and disperse. With OWB chimneys not high enough to carry the smoke past the heights of surrounding homes and local terrain, wood smoke, soot, and toxins may enter homes and yards of owners and neighbors who are situated close to OWBs. Wood smoke particulates, due to their small size, can remain suspended in the air for long periods of time, can cause a smokey haze, and can easily enter homes through air intakes, cracks, doors and windows. Effects on neighbors are especially apparent when OWBs are installed at the outermost limit of the owner's property, and in close proximity to structures on adjacent properties.

The OAG has received more than 50 complaints from individuals who are affected by OWB-generated smoke and odors.[27] The complaints filed with the OAG note the following:

1. Smoke from OWBs has led to a variety of symptoms including upset stomach, headaches, dizziness, respiratory effects, and throat and eye irritation.

2. Smoke from OWBs has prevented residents from enjoying activities inside and around their homes. Residents have been unable to use their porches and backyards or conduct normal activities such as walking the dog, gardening, or hanging laundry outside. Some residents do not allow their children to play outside because of the smoke.

3. Smoke from OWBs has forced residents to close their windows, doors, and air conditioning units, in an effort to keep the smoke and smoke odors from entering their homes. Residents have complained of wood smoke odors on items inside the home, such as clothing, curtains and upholstery. Smoky conditions indoors have sometimes set off carbon monoxide detectors.

4. Materials besides natural wood are burned in the OWBs, producing even greater amounts of noxious smoke and odors.

5. In a few cases, the unhealthy and nuisance conditions created by OWBs have caused complainants to sell their homes.

[27] Complaints have been received from people in the following counties: Broome, Cattaraugus, Chautauqua, Chemung, Chenango, Clinton, Dutchess, Franklin, Jefferson, Onondaga, Saratoga, St. Lawrence, Suffolk, Tioga, Ulster, Warren, and Wyoming. One OWB was adjacent to a public school.

III. OWB Efficiency, Costs, and Performance

According to the EPA, since OWBs are "designed to be installed outside of the home, and to heat by an indirect method, they are exempt from the EPA regulation(s)"[28] that cover indoor wood stoves. Currently, no standard test methods are available to evaluate the performance of OWBs. Approached by the Hearth, Patio, and Barbecue Association (HPBA) in an effort to make test data on OWBs comparable, the Association for Standards and Testing Materials (ASTM) established a committee to develop a consensus-based standard testing method for OWBs.[29]

Until a test method is established, it is impossible to assess with precision the claims of manufacturers regarding efficiency and costs of OWBs. Some limited testing information, however, suggests that OWBs may be not only less environmentally sound but may also be less efficient and economical than other common heating sources, such as indoor wood stoves, and gas- or oil-fueled furnaces.

A. Heating Efficiency

Heating efficiency is a measure of heat output relative to the input value of the fuel – the actual heat output in comparison to the potential heat output of the fuel. The EPA has found heating efficiencies of about 54 percent for conventional wood stoves, and 68 to 72 percent for EPA-certified wood stoves.[30] In comparison, data obtained from manufacturers on tests conducted on OWBs found that they have heating efficiencies ranging from 28 to 55 percent, with an average of 43 percent (see Appendix B).

B. Costs

One of the benefits of OWBs, as advertised by some manufacturers, is that customers will save thousands of dollars in heating costs over the course of a year. One manufacturer, for example, claims: "Over a ten-year period, a homeowner or business may save $10,000 to $50,000 dollars or more on heating costs."[31] Another advertises that one can "save 69 to 78% on your heating costs," and "you will save up to 90% on your heating and hot water bills."[32] However, these claims of cost savings may not withstand scrutiny. The initial cost of OWBs is significantly higher than that of other heating devices such as gas and oil furnaces (see Table 3), many of which will already be installed in the home. In addition, OWB

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[28] Excerpted language is from an EPA exemption letter provided to an OWB manufacturer in response to a request for determination of exempt status in 1999. Letter from EPA Office of Enforcement and Compliance, Energy and Transportation Division, J. Rasnic, Director, dated November 30, 1999.

[29] ASTM, *E06.54.08, Task Group on Outdoor Wood-Fired Hydronic Heaters*, Sheraton Hotel and Convention Center, Madison Wisconsin, December 1-2, 2004. The committee, with representatives from OWB manufacturers, and state and federal governments, is in the process of developing testing methods that can be applied to OWBs. While generally agreeing that a standard test method should be adopted, committee members are deliberating the quantity, quality, moisture content, and stacking position of the wood for the test burns. Ideally the adopted test method will be realistic and reproducible, to enable "factory-tested" comparable results among OWBs.

[30] EPA, *Residential Wood Combustion Technology Review*, Volume I. Technical Report. EPA-600/R-98-174a. (December 1998).

[31] Central Boiler, Inc., *available at* www.centralboiler.com (last accessed Feb. 18, 2005).

[32] Taylor Manufacturing, Inc., *available at* www.taylormfg.com (last accessed Feb. 23, 2005).

manufacturers' claims apparently do not take into account the cost of purchasing or harvesting wood fuel. When the latter cost is accounted for, any savings may vanish (see Table 4).

Table 3: Initial Cost of Various Heating Systems

Type of Heating System	Average Cost [i]
Outdoor Wood Boiler [ii] (43% Efficient)	$5500
Indoor Wood Stove[iii] Non-catalytic (68% Efficiency) Catalytic (72% Efficiency)	 $2075 $2425
Gas or Oil Fueled Forced Air Furnace [iv] (80% Efficient)	$1860
Gas or Oil Fueled Forced Air Furnace [iv] (90% Efficient)	$2690
Gas or Oil Hot Water Radiator [iv] (80% Efficient)	$3320
Gas or Oil Hot Water Radiator [iv] (90% Efficient)	$4260

[i] Costs are estimated based on average cost of unit plus installation. Does not include cost of internal home piping or duct work. Actual costs may vary widely based on manufacturer, efficiency, and region of the United States.

[ii] The estimated initial cost of an OWB is the average of the minimum unit cost of the five largest manufacturers plus the average cost of installation materials, based on information obtained by OAG from manufacturers.

[iii] Houck, J. and Tiegs, P., *Residential Wood Combustion–PM 2.5 Emissions*, OMNI Environmental Services, Inc., Emission Inventory Workshop, Reno, Nevada (July 1998).

[iv] The average costs of the gas and oil systems are based on surveys conducted by the Consumer Energy Council of America, reported in March 2001 in a report entitled, "*Oil, Gas, or...? An Evaluation of the Economics of Fuel Switching Versus Home Energy Conservation," available at* www.cecarf.org/Publications/MiscPub/FuelSwitchingReport.pdf.

Table 4: Fuel Costs for Various Heating Systems

Type of Fuel	Fuel Price [i]	Price per million BTU (Dollars)	Efficiency [ii]	Price per mmBTU adjusted for efficiency (Dollars)	Total Household Energy Cost per year (Dollars) [iii]
Wood (for use in OWB)	$170 per cord	$8.50	43%	$19.77	$1,977 (or less if not all purchased)
Wood (for use in catalytic indoor wood stove)	$170 per cord	$8.50	72%	$11.81	$1,181 (or less if not all purchased)
Wood (for use in non-catalytic indoor wood stove)	$170 per cord	$8.50	68%	$12.50	$1,250 (or less if not all purchased)
Oil	$1.99 per gallon	$14.35	78%	$18.40	$1,840
Gas	$1.13 per therm	$11.30	78%	$14.49	$1,449
Electricity	$0.094 per kilowatt hour	$27.46	97%	$28.31	$2,831

[i] Average efficiencies and price per million BTU for oil, gas, and electricity based on calculations by the Energy Information Administration, United States Department of Energy. "*How do I compare Heating Fuels*" (April 7, 2005), *available at* www.eia.doe.gov/neic/experts/expertanswers.html (last accessed May 31, 2005). We note that wood prices may vary widely compared to oil, gas and electricity. The heating fuel comparison calculator (Rev H-c 4/21/05) is available for download in Microsoft Excel format, *available at* www.eia.doe.gov/neic/experts/heatcalc.xls.

[ii] Average wood efficiency based on OWB efficiency testing provided in Appendix B of this report, and EPA, *Residential Wood Combustion Technology Review, Volume I. Technical Report.* EPA-600/R-98-174a. (December 1998).

[iii] The assumed approximate household energy consumption per year (100 million BTU) is based on the 2003 Annual Energy Review by the Energy Information Administration of the United States Department of Energy, *available at* www.eia.doe.gov/emeu/aer/consump.html (last accessed April 22, 2005).

C. Environmental Performance

OWB manufacturers have made a variety of claims regarding environmental performance, which do not have technical or scientific basis. One OWB manufacturer claims that its devices are smokeless and create "no creosote, no smoke, and no waste."[33] Another manufacturer claims that "the tangible proof of complete combustion is no visible smoke."[34] However, any combustion device will create gaseous and particulate emissions[35] and all wood combustion will create ash requiring disposal.

In addition, certain claims regarding potential fuels may not be entirely accurate. For example, some manufacturers claim erroneously that wood with high moisture content will create an efficient fire. One manufacturer claims that its OWB "doesn't smolder, it either burns hot or shuts down. Hotter fire will burn almost any material – even green wood."[36] Another states without basis that "we burn up to ½ less wood and emit up to ½ less smoke."[37] Additionally, some manufacturers, distributors, and dealers of OWBs advise their customers, both in print and verbally, that the stove will burn almost anything, including rotten wood, freshly cut and green wood, old building scraps, wood scraps (including nails), newspapers, corrugated cardboard boxes, pine cones, grass, yard trimmings, and sawdust.[38] One manufacturer claims that "our injection air furnace burns any type and quality of wood, wet or dry, unsplit and in lengths of up to 72 inches. The burn time average can reach 48 hours or more per fill."[39] One manufacturer claims that its device can help control allergies, stating, "many people suffer from allergies. With the furnace outside, smoke, fuel odors, and fumes are kept outside."[40] Manufacturers and dealers also claim that OWBs will heat large structures while "eliminating waste," without making clear that household waste should not be burned in the OWB.

IV. Current Regulation of OWBs

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[33] Dectra Corporation, *available at* www.dectra.net/garn (last accessed May 24, 2005).

[34] Turbo Burn, Inc., *available at* www.turboburn.net (last accessed Feb 25, 2005).

[35] One claimed benefit of burning wood in OWBs (and wood stoves) is that wood combustion has the potential to contribute less to global warming than the combustion of fossil fuels if the wood burned is replaced by new trees, which remove carbon from the atmosphere. However, the absence of particulate controls on OWBs may negate any such benefit because the black carbon soot emitted by OWBs also contributes to global warming.

[36] Aqua-Therm, LLC., *available at* www.aqua-therm.com (last accessed Feb 18, 2005).

[37] Heatmor, Inc., *available at* www.heatmor.com (last accessed May 27, 2005), and OWB owner's manual, page 25.

[38] Mahoning Outdoor Furnace, Inc., *available at* www.shol.com/mahoning (last accessed Feb 25, 2005); Taylor Manufacturing, Inc., *available at* www.taylormfg.com (last accessed May 31, 2005) and OWB sales brochure; Innotech Developments, *available at* www.outdoorfurnaces.com (last accessed Feb 23, 2005).

[39] Outside Heating Systems, *available at* www.wooddoctorfurnace.com (last accessed May 26, 2005).

[40] Freedom Outdoor Furnace, OWB sales brochure.

A. Federal and State Regulations

The EPA does not currently regulate the manufacture, sale, or efficiency claims of OWBs. OWBs are not subject to the federal regulations governing indoor stoves and fireplaces, which are tested and regulated by the EPA for safety, emissions, and efficiency. Any new residential wood stove sold in the United States after July 1, 1992 must be "Phase 2" certified, meaning that it does not emit more than 4.1 grams of particulate matter per hour for catalytic stoves and 7.5 grams of particulate matter per hour for noncatalytic stoves.[41] All of the OWB units tested to date for PM (see Table 2 and Appendix A) far exceed the PM limits that apply to EPA-certified wood stoves.

In New York State, there are no regulations directed particularly at OWBs. DEC regulations provide that "no person shall cause or allow emissions of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration which are injurious to human, plant, or animal life or to property, or which unreasonably interfere with the comfortable enjoyment of life or property."[42] Operation of OWBs may also violate the DEC smoke regulation which states, in part, that "no person shall operate a stationary combustion installation which exhibits greater than twenty percent opacity, except for one six-minute period per hour of not more than twenty-seven percent opacity."[43] DEC has taken enforcement actions involving OWB owners on several occasions based on these regulations.

The states of Vermont and Washington do regulate OWBs. The Vermont regulations[44] include the following provisions:

(1) Installation of an OWB must be at least 200 feet from the nearest neighboring residence;

(2) The stack on the furnace must be higher than the roof line if the furnace is between 200 feet and 500 feet from the nearest neighboring home;

(3) The OWB must comply with local ordinances and its operation must not create a nuisance;

(4) Dealers and sellers of OWBs must provide buyers with a legal notice stating that: only untreated natural wood may be burned; installation is subject to the distance and stack height requirements stated above; and that the OWB, even if meeting the above requirements, may not be used if the terrain is inappropriate and renders the OWB to be a nuisance or public health hazard. This legal notice must be signed by both the buyer and seller and filed with the Air Pollution Control Division of Vermont prior to delivery of the OWB to the buyer.

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[41] Fisher, L., et al., *Long-Term Performance of EPA-Certified Phase 2 Woodstoves, Klamath Falls and Portland, Oregon: 1998/1999*, EPA/600/SR-00/100 (2000); see also, Subpart AAA - Standards of Performance for New Residential Wood Heaters, 40 CFR §§ 60.530-60.539b.

[42] 6 NYCRR § 211.2.

[43] 6 NYCRR § 227-1.3. Opacity is defined as: "The degree to which emissions other than water reduce the transmission of light and obscure the view of an object in the background." 6 NYCRR§200.1(ay). The generally applicable opacity limit of twenty percent is roughly equivalent to a light grey smoke.

[44] Vermont Air Pollution Regulation, section 5-204, Outdoor Waterstoves (September 1997).

The Washington regulation[45] establishes emission standards, certification standards and procedures, curtailment rules, and fuel restrictions for solid fuel burning devices. OWBs are considered solid wood burning devices, which, after January 1, 1995, must be shown to comply with an emission standard of 4.5 grams PM per hour before they can be offered for sale in the State of Washington. Prohibited fuels include garbage, treated wood, plastic and plastic products, rubber products, animal carcasses, asphaltic products, waste petroleum products, paints and chemicals, and any substance that normally emits dense smoke or obnoxious odors. OWBs, like other solid fuel burning devices, must comply with an opacity standard not to exceed an average of 20 percent opacity for six consecutive minutes in any one-hour period. Retailers must provide information on the proper operation of the unit, including information that opacity levels of ten percent or less are attainable through proper operation.

B. Local Requirements

Some local governments in New York State have deemed OWBs a nuisance because of smoke and toxic emissions. Several towns and villages have placed restrictions on OWBs ranging from meeting certain requirements for setback distances, chimney height, terrain, population density and other factors, to outright bans. These municipal requirements are shown in Table 5.

[45] Washington Administrative Code 173-433-100 (3), Solid Fuel Burning Devices (January 1995).

Table 5: Municipalities with Requirements Pertaining to OWBs

Town / Village and County	Date	Regulate*	Ban
Barneveld, Village of (Oneida County)	Apr 2005		**X**
Camden, Village of (Oneida County)	June 1999		**X**
Canton, Town of (St. Lawrence County)	Dec 2003		**X**
Edwards, Village of (St. Lawrence County)	June 2003		**X**
Heuvelton, Village of (St. Lawrence County)	Nov 2003		**X**
Holland Patent, Village of (Oneida County)	Apr 2005		**X**
Kingsbury, Town of (Washington County)	Sep 2004	**X**	
Lowville, Village of (Lewis County)	Dec 2001		**X**
Marcellus, Village of (Onondaga County)	Jan 2004		**X**
Moreau, Town of (Saratoga County) (proposed)	Oct 2004	**X**	
Otego, Village of (Otsego County)	Mar 2001	**X**	**X**
Prospect, Village of (Oneida County)	Mar 2005		**X**
Queensbury, Town of (Warren County)	May 2004	**X**	
South Glens Falls, Village of (Saratoga County)	Dec 2003	**X**	
Watertown, City of (Jefferson County)	Oct 2003		**X**

* See Box on following page for further details on requirements**.**

Specific Requirements of New York State Municipalities Regarding OWBs.

Town of Kingsbury - Installation of an OWB requires a permit and must meet the following requirements: (a) installed, operated, and maintained according to manufacturer instructions, (b) fueled with natural untreated woods, (c) set back at least 25 feet from nearest property line, and (d) minimum chimney height of 15 feet.

Town of Moreau (proposed) **-** A permit, issued by the Town Building Inspector or Code Enforcement Officer, is required for operation of an OWB and must meet the following requirements: (a) only firewood and untreated lumber may be burned, (b) may be installed only in permitted zones, (c) must be installed on a lot of three acres or more, (d) must be set back at least 500 feet from nearest lot line, (e) may only be operated between September 1st and May 31st, and (f) must be equipped with a properly functioning spark arrestor.

Village of Otego - The construction and operation of OWBs are prohibited with the exception of OWBs already in operation. No OWB already in operation may be extended, enlarged, or restored beyond 75% of its value, and/or re-established after use is discontinued for more than seven months.

Town of Queensbury - A permit is required for operation of an OWB and must meet the following requirements: (a) only firewood and untreated lumber may be burned, (b) may be installed only in permitted zones, (c) must be installed on a lot of three acres or more, (d) must be set back at least 200 feet from nearest lot line, (e) may only be operated between September 1st and May 31st, and (f) must be equipped with a properly functioning spark arrestor.

Village of South Glens Falls - Installation of any OWB must meet the following requirements: (a) smokestack must exceed four feet and be higher than any adjacent structure within 50 feet of the furnace, (b) must be installed at least 200 feet from the closest residential property line, (c) may only burn wood, and (d) may not be used as a waste incinerator.

V. Recommendations

A. Develop Federal and State Regulations

The adoption of federal regulations is the best way to address effectively the problems identified in this report. Ideally, such regulations would require emissions testing, performance standards, and control technologies to ensure that OWBs are environmentally sound and do not pose a health hazard to users and neighbors. Given the complexities of establishing testing protocols and emission limits, there are significant advantages to manufacturers of federal regulation, instead of a multitude of state and local limits. Consistent with all other Clean Air Act programs, however, it must be clear that any federal regulations only set a floor for health protections, and that states are free to enact stricter protections.

In the absence of federal regulations, DEC could fill the regulatory void by developing an air quality regulatory program that would effectively address OWB problems across the state. DEC could establish siting, operation, and disclosure standards and perhaps emission limits. A DEC rulemaking would offer the additional advantage of providing interested affected parties with the opportunity to shape policy through submission of comments and participation in rulemaking hearings.

B. Adopt Local Requirements

Towns and villages can evaluate the suitability of OWB operation in their jurisdictions. Just as local zoning codes can address activities that create nuisances and require permits or establish conditions for certain activities, communities can consider requiring permits before installation of an OWB, especially in more densely settled areas. In evaluating permit applications, determinations can be made whether local conditions such as setback distances, terrain, and sensitive neighbors such as schools, hospitals and residences are compatible with OWB operation.

Local requirements could limit acceptable fuel to dry, natural, and untreated wood. A document acknowledging that limitation, signed by the OWB purchaser, could be filed with the local code officer, thereby becoming an enforceable condition of the usage of the OWB. The Town of Queensbury's ordinance is shown in Appendix D, as an example.

C. Improve Performance of and Information About OWBs

Even in the absence of regulation, manufacturers can take steps to reduce OWB emissions by adding pollution control devices such as catalytic converters, installing taller stacks for smoke dispersal, or re-designing OWB units to minimize the smoldering and smoke that are inherent in the majority of the OWBs currently on the market.

Even before OWBs are improved, manufacturers should ensure that their advertising and marketing materials reflect the basis for any claims about efficiency, cost, and environmental performance and that handling instructions make clear that only dry seasoned wood be burned. Retailers should help prospective customers assess the suitability of an OWB in light of the customer's property, taking into account such factors as proximity of neighboring residences, terrain, and nearby property uses (residential, commercial, industrial, size of OWB, etc.).

Finally, OWB manufacturers and distributors should commit to provide technical assistance in the event that an OWB creates a smoke nuisance for an OWB owner or neighbors, or is not working as advertised. The manufacturer or distributor, by phone or personal visit, should evaluate the situation and recommend technical solutions, such as extending the smoke stack to a height that is greater than the height of the neighboring roof line or the installation of a control apparatus, such as a catalytic device.

D. Increase Consumer Awareness

Before purchasing an OWB, potential buyers should consider the size and location of their property, their heating needs, and suitable wood availability in addition to local laws and regulations. Consumers should carefully scrutinize manufacturer claims.

For people who have already purchased an OWB or who live near an OWB that is creating smoky conditions, these steps may help resolve the situation:

(1) OWB owners should make sure they are operating the OWB only with suitable materials. If smoky conditions persist despite burning of proper materials, contact the manufacturer or distributor of the OWB unit. The manufacturer may be able to assess, adjust, and/or retrofit the unit to reduce the smoke or emissions problem by, for example, installing a taller smoke stack and/or catalytic device.

(2) If the manufacturer or distributor cannot or will not provide assistance, or if the OWB operator will not contact the manufacturer or distributor, contact the regional DEC office that serves the county. The DEC may be able to assist in evaluating the smoke opacity to determine whether excessive smoke is present and may be able to suggest ways to improve the situation. Contact information for local officials, regional offices of the DEC, and county health departments is listed in Appendix C.

(3) OWBs should not be used to burn pressure treated wood, painted wood, household garbage or other waste materials. Local zoning or building code officers, local fire officials, a regional DEC office, or county health departments should be called for assistance.

(4) If experiencing conditions detrimental to health (smoke in the home causing respiratory difficulties, for example), contact the public health department that serves the county (See contact list in Appendix C). The county or state DOH may be able to assist in evaluating the situation to determine if a condition exists that is detrimental to life or health.

(5) If neither DEC nor DOH is able to assist, contact the Environmental Protection Bureau at the New York State Office of the Attorney General for further advice and assistance at 1-518-474-8096 or 1-800-771-7755.

APPENDIX A: EMISSIONS FROM OUTDOOR WOOD BOILERS AS DETERMINED IN EPA OR LABORATORY TESTS [i]

OWB	Particulate Matter (grams per hour)	Polycyclic Aromatic Hydrocarbons (grams per hour)	Number of Tests
OWB A [ii]	73	1.2	4
OWB B [ii]	26	0.72	4
OWB C [iii]	84	NA	5
OWB D [iii]	60	NA	4
OWB E [iii]	108	NA	2
OWB F [iii]	18	NA	2
OWB G [iii]	49	NA	7
OWB H [iii]	33	NA	2
OWB I [iv]	147	NA	2
OWB J [iv]	118	NA	2
OWB K [v]	179	NA	1 cordwood
OWB L [v]	269	NA	1 lumber
Average [vi]	**71.6**	**0.96**	

[i] The results from Intertek and Omni laboratories were provided to the OAG by the manufacturers. Note that due to the current lack of an established test methodology, the tests used may have differed. Thus, the results should be considered as a whole; comparisons between boilers may not be appropriate. For this reason, manufacturers' names are omitted.

[ii] Valenti, J. and Clayton, R., *Emissions from Outdoor Wood-Burning Residential Hot Water Furnaces*, EPA-600/R-98-017 (February 1998); names of OWB manufacturer 'A' and 'B' not provided in report.

[iii] Intertek Laboratories 2004.

[iv] Omni Laboratories 2004.

[v] Intertek Laboratories 2004. Data provided on behalf of ASTM Committee to develop testing methods, using old 'nameless' OWB; data excluded from calculation of average.

[vi] Average of OWB units A through J; data excluded for OWB units K and L.

APPENDIX B: HEATING EFFICIENCY OF OUTDOOR WOOD BOILERS [i]

OWB	Heating Efficiency	Number of Tests
OWB A [ii]	45%	4
OWB B [ii]	55%	4
OWB C [iii]	30%	5
OWB D [iii]	37%	4
OWB E [iii]	28%	2
OWB F [iii]	31%	2
OWB G [iii]	55%	7
OWB H [iii]	37%	2
OWB I [iv]	55%	2
OWB J [iv]	53%	2
OWB K [v]	45%	1 cordwood
OWB L [v]	46%	1 lumber
Average [vi]	**43%**	

[i] The results from Intertek and Omni Laboratories were provided to the OAG by the manufacturers. Note that due to the current lack of an established test methodology, the tests used may have differed. Thus, the results should be considered as a whole; comparisons between boilers may not be appropriate. For this reason, manufacturers' names are omitted.

[ii] Valenti, J. and Clayton, R., *Emissions from Outdoor Wood-Burning Residential Hot Water Furnaces*, EPA-600/R-98-017 (February 1998); names of OWB manufacturer 'A' and 'B' not provided in report.

[iii] Intertek Laboratories 2004.

[iv] Omni Laboratories 2004.

[v] Intertek Laboratories 2004. Data provided on behalf of ASTM Committee to develop testing methods, using old 'nameless' OWB; data excluded from calculation of average.

[vi] Average of OWB units A through J; data excluded for OWB units K and L.

APPENDIX C: NEW YORK STATE CONTACTS FOR OWB PROBLEMS

(1) Local Zoning, Health, and Code Enforcement Officials

New York State County, City, Town, and Village Contact Information is available in local telephone directories or is *available at* www.nysgov.com/citguide.cfm?context=citguide&content=munibycounty1

(2) Regional Department of Environmental Conservation (DEC) Offices

Region	County	DEC Regional Office
1	Nassau and Suffolk	631-444-0205
2	Bronx, Brooklyn, Manhattan, Queens, and Staten Island	718-482-4944
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, and Westchester	845-256-3045
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schoharie, and Schenectady	518-357-2350
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren, and Washington	518-623-1212
6	Herkimer, Jefferson, Lewis, Oneida, and St. Lawrence	315-785-2513
7	Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Oswego, Tioga, and Tompkins	315-426-7552
8	Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, and Yates	585-226-5311
9	Allegany, Cattaraugus, Chautauqua, Erie, Niagara, and Wyoming	716-851-7130

(3) County Health Department

County	Health Department	County	Health Department
Albany	518-447-4620	Niagara	716-439-7444
Allegany	585-268-9250	Oneida	315-798-5064
Bronx (NYC)	212-268-7185	Onondaga	315-435-6623
Broome	607-778-2887	Ontario	315-789-3030
Cattaraugus	716-373-8050	Orange	845-291-2331
Cayuga	315-253-1405	Orleans	585-589-3272
Chautauqua	716-753-4481	Oswego	315-349-3564
Chemung	607-737-2019	Otsego	607-432-3911
Chenango	607-337-1673	Putnam	845-278-6130
Clinton	518-565-4870	Queens (NYC)	212-268-7185
Columbia	518-828-3358	Rensselaer	518-270-2674
Cortland	607-753-5035	Richmond (NYC)	212-268-7185
Delaware	607-432-3911	Rockland	845-364-2608
Dutchess	845-486-3404	St. Lawrence	315-386-1040
Erie	716-858-7677	Saratoga	518-793-3893
Essex	518-891-1800	Schenectady	518-386-2818
Franklin	518-891-1800	Schoharie	518-295-8382
Fulton	315-866-6879	Schuyler	607-324-8371
Genesee	585-344-8506	Seneca	315-539-1945
Greene	607-432-3911	Steuben	607-324-8371
Hamilton	518-891-1800	Suffolk	631-853-3058
Herkimer	315-866-6879	Sullivan	845-794-2045
Jefferson	315-785-2277	Tioga	607-687-8566
Kings (NYC)	212-268-7185	Tompkins	607-274-6688
Lewis	315-785-2277	Ulster	845-340-3150
Livingston	585-243-7280	Warren	518-793-3893
Madison	315-366-2526	Washington	518-793-3893
Monroe	585-274-6067	Wayne	315-789-3030
Montgomery	315-866-6879	Westchester	914-813-5000
Nassau	516-571-3410	Wyoming	585-786-8894
New York (NYC)	212-268-7185	Yates	315-789-3030

(4) New York State Office of the Attorney General
Environmental Protection Bureau: 800-771-7755

APPENDIX D: TOWN OF QUEENSBURY ORDINANCE

LOCAL LAW NO.: ___ OF 2004

A LOCAL LAW TO AMEND THE QUEENSBURY TOWN CODE BY REPLACING CHAPTER 119 ENTITLED "OUTDOOR FURNACES" WITH A NEW CHAPTER 119 REGULATING THE USE OF OUTDOOR FURNACES IN THE TOWN OF QUEENSBURY.

BE IT ENACTED BY THE TOWN BOARD OF THE TOWN OF QUEENSBURY AS FOLLOWS:

1. Title and Authority – This Local Law shall be known as the Town of Queensbury Outdoor Furnace Local Law. It is adopted pursuant to Municipal Home Rule Law § 10.

2. Legislative Intent – Although outdoor furnaces may provide an economical alternative to conventional heating systems, concerns have been raised regarding the safety and environmental impacts of these heating devices, particularly the production of offensive odors and potential health effects of uncontrolled emissions. This Local Law is intended to ensure that outdoor furnaces are utilized in a manner that does not create a nuisance and is not detrimental to the health, safety and general welfare of the residents of the Town.

3. Definitions – "Outdoor Furnace" means any equipment, device or apparatus, or any part thereof, which is installed, affixed or situated outdoors for the primary purpose of combustion of fuel to produce heat or energy used as a component of a heating system providing heat for any interior space.

"Untreated Lumber" means dry wood which has been milled and dried but which has not been treated or combined with any petroleum product, chemical, preservative, glue, adhesive, stain, paint or other substance.

"Firewood" means trunks and branches of trees and bushes but does not include leaves, needles, vines or brush smaller than three inches (3") in diameter.

4. Permit Required – No person shall cause, allow or maintain the use of an Outdoor Furnace within the Town of Queensbury without first having obtained a permit from the Town Fire Marshal. Application for permit shall be made to the Fire Marshal on the forms provided.

5. Existing Outdoor Furnaces – Any Outdoor Furnace in existence on the effective date of this Local Law shall be permitted to remain provided that the owner applies for and receives a permit from the Town Fire Marshal within one (1) year of such effective date; provided, however, that upon the effective date of this Local Law all the provisions hereof except paragraphs 6(B), (C) and (D) shall immediately apply to existing Outdoor Furnaces. All of the provisions of this Local Law shall continue to apply to existing Outdoor Furnaces which receive permits except paragraphs 6(B), (C) and (D). If the owner of an existing Outdoor Furnace does not receive a permit within one (1) year of the effective date of this Local Law, the Outdoor Furnace shall be removed. "Existing" or "in existence" means that the Outdoor Furnace is in place on the site.

6. Specific Requirements –

A. Permitted Fuel – Only Firewood and Untreated Lumber are permitted to be burned in any Outdoor Furnace. Burning of any and all other materials in an Outdoor Furnace is prohibited.

B. Permitted Zones – Outdoor Furnaces shall be permitted only in the LC-10A, LC-42A, RR-5A zoning districts as shown on the Town's Zoning Map.

C. Minimum Lot Size – Outdoor Furnaces shall be permitted only on lots of three (3) acres or more.

D. Setbacks – Outdoor Furnaces shall be set back not less than 200 feet (200') from the nearest lot line.

E. Months of Operation – Outdoor Furnaces shall be operated only between September 1st and May 31st .

F. Spark Arrestors – All Outdoor Furnaces shall be equipped with properly functioning spark arrestors.

7. Suspension of Permit – A permit issued pursuant to this Local Law may be suspended as the Fire Marshal may determine to be necessary to protect the public health, safety and welfare of the residents of the Town of Queensbury if any of the following conditions occurs:

A. Emissions from the Outdoor Furnace exhibit greater than 20 percent (20%) opacity (six minute average), except for one continuous six-minute period per hour of not more than 27 percent (27%) opacity, which shall be determined as provided in 6 NYCRR 227-1.3(b);

B. Malodorous air contaminants from the Outdoor Furnace are detectable outside the property of the person on whose land the Outdoor Furnace is located;

C. The emissions from the Outdoor Furnace interfere with the reasonable enjoyment of life or property;

D. The emissions from the Outdoor Furnace cause damage to vegetation or property; or

E. The emissions from the Outdoor Furnace are or may be harmful to human or animal health.

A suspended permit may be reinstated once the condition which resulted in suspension is remedied and reasonable assurances are given that such condition will not recur. Recurrence of a condition which has previously resulted in suspension of a permit shall be considered a violation of this Local Law subject to the penalties provided in paragraph 9 hereof.

8. Waivers; Board of Health Ratification – Where the Town Board of Health finds that extraordinary and unnecessary hardships may result from strict compliance with this Local Law, it may vary the regulations so that substantial justice may be done and the public interest secured, provided that such variations will not have the effect of nullifying the intent and purpose of this Local Law or of jeopardizing the health, safety or welfare of the public. In varying any regulations, the Board of Health may impose such conditions and requirements as it deems reasonable and prudent. The Board of Health may, at its discretion, hold a public hearing as part of its review. If the Board of Health grants the waiver, a permit shall be issued for the Outdoor Furnace. If the Board of Health denies the waiver, the Outdoor Furnace must either be brought into compliance with this Local Law or removed. If the Board of Health does not take any action with respect to the waiver within sixty (60) days from its receipt of an

application for waiver, the waiver shall be deemed denied.

9. Enforcement; Revocation of Permit – Failure to comply with any of the provisions of this Local Law shall be a violation and, upon conviction thereof, shall be punishable by a fine of not more than $500 or imprisonment for a period of not more than ten (10) days, or both, for the first offense. Any subsequent offense shall be punishable by a fine of not more than $1,000 or imprisonment for a period of not more than thirty (30) days, or both. In addition, any permit issued pursuant to this Local Law shall be revoked upon conviction of a second offense and the subject Outdoor Furnace shall not be eligible for another permit. Each day that a violation occurs shall constitute a separate offense. The owners of premises upon which prohibited acts occur shall be jointly and severally liable for violations of this Local Law. Any fine imposed hereunder shall constitute a lien upon the real property where the Outdoor Furnace is located until paid.

10. Effect of Other Regulations – Nothing contained herein shall authorize or allow burning which is prohibited by codes, laws, rules or regulations promulgated by the United States Environmental Protection Agency, New York State Department of Environmental Conservation, Adirondack Park Agency, Lake George Park Commission any other federal, state, regional or local agency. Outdoor Furnaces, and any electrical, plumbing or other apparatus or device used in connection with an Outdoor Furnace, shall be installed, operated and maintained in conformity with the manufacturer's specifications and any and all local, State and Federal codes, laws, rules and regulations. In case of a conflict between any provision of this Local Law and any applicable Federal, State or local ordinances, codes, laws, rules or regulations, the more restrictive or stringent provision or requirement shall prevail.

11. Severability – The invalidity of any clause, sentence, paragraph or provision of this Local Law shall not invalidate any other clause, sentence, paragraph or part thereof.

12. Repealer – All Local Laws or ordinances or parts of Local Laws or ordinances in conflict with any part of this Local law are hereby repealed.

13. Effective Date – This Local Law shall take effect upon filing in the office of the New York State Secretary of State or as otherwise provided by law.

APPENDIX E: REFERENCES AND ADDITIONAL INFORMATION

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Zelikoff, J., et al., *The toxicology of inhaled woodsmoke*, J Toxicology and Environmental Health, Part B, 5: 269-282 (2002).

Select Websites for More Information

American Lung Association, *available at* www.lungusa.org
Woodburning, *available at* www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=23354

Clean Air Revival, Inc. Burning Issues, *available at* www.BurningIssues.com

Department of Environmental Conservation, New York State, *available at* www.dec.state.ny.us

Environmental Protection Agency, United States.
Main Web Page, *available at* www.epa.gov
Fine Particulate Matter, *available at* www.epa.gov/pmdesignations/index.htm

Puget Sound Clean Air Agency, *available at* www.pscleanair.org

Hearth, Patio, and Barbecue Association, *available at* www.hpba.org
Smoke Troubleshooting Checklist for OWBs, *available at* www.hpba.org/govrelations/troubleshootingGuidlines.pdf

Office of the Attorney General, New York State, *available at* www.oag.state.ny.us

Washington State Department of Ecology
Outdoor Burning, *available at* www.ecy.wa.gov/pubs/9204.pdf
Health Effects of Wood Smoke, *available at* www.ecy.wa.gov/biblio/92046.html

OWB Manufacturers

Alternate Heating Systems, Inc.
2395 Little Egypt Road
Harrisonville, PA 17228
www.alternateheatingsystems.com

Aqua-Therm LLC
48301 State Hwy 55
Brooten, MN 56316
www.aqua-therm.com

Central Boiler, Inc.
20502 160th Street
Greenbush, MN 56726
www.centralboiler.com

Charmaster Products, Inc.
2307 Highway 2 West
Grand Rapids, MN 55744
www.charmaster.com

Dectra Corporation
3425 33rd Ave NE
St. Anthony, MN 55418
www.dectra.net/garn

Freedom Outdoor Furnace
7958 Curwensville Tryone Hwy
Olanta, PA 16863
www.freedomoutdoorfurnace.com/

Global Hydronics
Box 717
Winkler, Manitoba CANADA R6W 4A1
www.globalhydronics.com

Hardy Manufacturing
12345 Road 505
Philadelphia, MS 39350
www.hardyheater.com

Heatmor Inc.
105 Industrial Park Court NE
Warroad, MN 56763
www.heatmor.com

Heat Innovations
499 Manitoba Road
P.O. Box 989
Winkler, MB R6W 4B1
www.heatinn.com

Heatsource1
2201 Ridgeview Drive
Beatrice, NE 68310
www.heatsource1.com

Hicks Waterstoves and Solar Systems
2541 South Main Street
Mount Airy, NC 27030

Horstmann Industries, Inc.
301 Second Street
Elroy, WI 53929
www.royallfurnace.com

Innotech Developments
2015 James Street South
Thunder Bay, ON P7J1G6
www.outdoorfurnaces.com

Johnson Manufacturing
N5499 County E
Ogdensburg, WI 54962
www.hud-son.com/woodfurnaces.htm

Mahoning Outdoor Furnace
RD #1 Box 250
Mahaffey, PA 15754
www.shol.com/mahoning

Noonan's Welding & Heating
105 1st Street South
Keewatin, MN 55753
www.northlandoutdoorwoodfurnace.com

Northwest Manufacturing
600 Polk Ave SW
Red Lake Falls, MN 56750
www.woodmaster.com

Outside Heating Systems - Wood Doctor
Box 567
Stewiacke, NS
B0N 2JO Canada
www.wooddoctorfurnace.com

Pro-Fab Industries/Cozeburn
Box 112
Arborg, Manitoba, Canada ROC OAO
www.profab.org

Tarm USA, Inc.
Main Street Box 285
Lyme, NH 03768
www.woodboilers.com

Taylor Manufacturing, Inc.
1585 US HWY 701 South
Elizabethtown, NC 28337
www.taylormfg.com

Timber Ridge, Inc.
2020 Highway 11-E
Jonesborough, TN 37659
www.freeheatmachine.com

Turbo Burn, Inc.
4225 E Joseph
Spokane, WA 99217
www.turboburn.net

STATE OF NEW YORK
OFFICE OF THE ATTORNEY GENERAL

ELIOT SPITZER
Attorney General

DIVISION OF PUBLIC ADVOCACY
ENVIRONMENTAL PROTECTION BUREAU

August 11, 2005

VIA OVERNIGHT MAIL

The Honorable Stephen L. Johnson
Administrator, Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Re: Petition for rulemaking under 42 U.S.C. § 7411(b)(1)
Regarding Outdoor Wood Boilers

Dear Administrator Johnson:

The States of New York, Connecticut, Maryland, Massachusetts, Michigan, New Jersey and Vermont, and the Northeast States for Coordinated Air Use Management (NESCAUM) hereby petition the U.S. Environmental Protection Agency (EPA) to use its authority under section 111(b)(1) of the Clean Air Act (the "Act"), 42 U.S.C. § 7411(b)(1), to list outdoor wood boilers (OWBs) as a category of stationary sources under section 111(b)(1)(A) and to promulgate standards of performance for OWBs under 42 U.S.C. § 7411(b)(1)(B). In the alternative, after listing OWBs as a category of stationary sources under section 111(b)(1)(A), EPA could revise the existing standards for residential wood heaters, at 40 CFR §§ 60.530-60.539b, to include standards for OWBs.

As explained in the attached report of the New York Attorney General's Office, Environmental Protection Bureau, entitled, *Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State* (the "New York Report"), OWBs are becoming increasingly common in rural and suburban towns and villages throughout much of the nation. Emissions of fine particulate matter (particulate matter with a diameter less than 2.5 microns [PM 2.5]) and toxic materials from OWBs exceed those from indoor wood stoves (called wood heaters by EPA), both on a per-device basis and in proportion to the energy created. Despite polluting at a significantly higher rate than residential wood heaters, OWBs are exempt from the standard applicable to residential wood heaters and are not required to meet any testing, performance, or emission standards.

Notable findings of the New York Report include:

- While advertised as a clean economical way to heat one's house and water, OWBs may be among the dirtiest and least economical modes of residential heating, especially when improperly used;

- Even when used properly, OWBs emit, on an average per hour basis, about 4 times as much PM 2.5 as conventional wood stoves, about 12 times as much PM 2.5 as EPA-certified wood stoves, 1000 times more PM 2.5 than oil furnaces, and 1800 times more PM 2.5 than gas furnaces;

- When OWBs are used improperly to burn wet or treated wood, scrap, or garbage, they generate even more smoke and emit additional toxic chemicals;

- The pollutants emitted by OWBs can cause or contribute to short-term health harms such as eye, nose, throat, and lung irritation, coughing and shortness of breath, and long-term health effects such as asthma, heart and lung disease, and cancer;

- The generally short chimneys and reduced draft of OWBs fail to disperse emissions adequately and can cause smoky conditions at or near ground level;

- OWBs are generally more expensive to install than comparable heating sources using oil, or gas, or indoor wood stoves, and may be more expensive to operate depending on the availability and price of dry seasoned wood;

- OWBs do not currently have to meet federal or state performance emission standards;

- The absence of any federal regulations has led to various state and local efforts to regulate OWBs.

Since the problems associated with OWBs are widespread and exist across much of the northern U.S., it is sensible for the federal government to enact federal standards of performance, as it has with respect to indoor wood heaters, so as to avoid the development of a patchwork of state and local regulations.

Section 111(b)(1)(A) requires EPA to include in the listing of categories of stationary sources under section 111 a category that "causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health and welfare." The findings in the New York Report establish that OWBs should be listed. Accordingly, the EPA should promulgate regulations for OWBs under section 111(b)(1)(B), establishing standards of performance that reflect the degree of emission limitation achievable through the best system of emission reduction that has been adequately demonstrated. 42 U.S.C. § 7411(a)(1). Consistent with the general framework of the Act, such federal regulations should serve as a "floor," allowing states or municipalities to enact more stringent regulations as necessary to combat particularized local air quality problems.

Petition to EPA by NY, CT, MD, MA, MI, NJ, VT and NESCAUM
August 11, 2005

The time has come for EPA to regulate emissions from OWBs in order to protect public health and the environment. Therefore, please consider this letter to be a formal request pursuant to the Administrative Procedure Act, 5 U.S.C. § 553(e), for a rulemaking to list OWBs as a category of stationary sources and to establish standards for emissions from new OWBs.

Sincerely,

ELIOT SPITZER
Attorney General
State of New York

On behalf of:

RICHARD BLUMENTHAL
Attorney General
State of Connecticut

THOMAS F. REILLY
Attorney General
Commonwealth of Massachusetts

STEVEN E. CHESTER
Director
Michigan Department of Environmental Quality

JOHN J. FARMER, JR.
Attorney General
State of New Jersey

WILLIAM H. SORRELL
Attorney General
State of Vermont

ARTHUR N. MARIN
Executive Director
Northeast States for Coordinated Air Use Management (NESCAUM)

September 23, 2005

Mr. Stephen L. Johnson, Administrator
Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Re: Petition for rulemaking under 42 U.S.C. § 7411(b)(1) regarding Outdoor Wood Boilers

Dear Administrator Johnson:

The State of Maine wishes to add its voice to those calling upon U.S. Environmental Protection Agency (EPA) to use its authority under section 111(b)(1) of the Clean Air Act (the "Act"), 42 U.S.C. § 7411(b)(1), to list outdoor wood boilers (OWBs) as a category of stationary sources under section 111(b)(1)(A) and to promulgate standards of performance for OWBs under 42 U.S.C. § 7411(b)(1)(B). In the alternative, after listing OWBs as a category of stationary sources under section 111(b)(1)(A), EPA could revise the existing standards for residential wood heaters, at 40 CFR §§ 60.530-60.539b, to include standards for OWBs.

We have reviewed the New York State Attorney General's report entitled, *Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State* and agree with its findings (submitted to EPA on August 11, 2005). We incorporate that report by reference in this letter. The Maine Department of Environmental Protection estimates that over 1500 OWB units have been sold in Maine and we believe that the rate of sales is increasing with the rising cost for fossil fuel. Along with the increase in sales comes an increase in the number of complaints from neighbors who are being adversely affected by the emissions from the OWBs. Maine is considering regulating these units in order to reduce the adverse effect that they have on local, regional and state air quality, but we believe strong federal regulation is also essential..

Maine has undertaken a project to evaluate the emission of hazardous air pollutants to Maine's air. We are assessing the emission with a weighted value for the seriousness of the toxicity for the pollutants. Among the different source categories that we evaluated, we find that the emissions from residential wood burning make the top ten list of toxic emission sources in the state. This estimate does not differentiate emissions from EPA certified stoves versus non-certified stoves and OWBs but it serves as a warning about the emission from unregulated wood stove. The impact and danger from unregulated wood stove emission has been recognized by EPA and fostered EPA's own Wood Stove Change-Out initiative. Eliminating non-certified

wood stoves is an excellent goal but it is futile to reduce emissions from these wood stoves and fireplaces while OWBs are not required to employ the best available emission reduction technology, whether it be in the form of an add-on control or integral in the devices design.

The problems posed by OWBs are spreading through-out the Northeast and upper Midwest. Since this is not a localized problem, it is incumbent on the Environmental Protection Agency to enact a performance standard for application across the country. This approached has proven successful for many categories of emission sources including indoor wood heaters. A federal emission standard could prevent the emergence of a varied palette of local and state standards; the costs associated with promulgating these standards; and the cost to the regulated community of developing and marketing their OWBs for each unique area.

Maine requests that EPA promulgate regulations for OWBs, establishing standards of performance that reflect the degree of emission limitation achievable through the best system of emission reduction that has been adequately demonstrated. Many homeowners and businesses in the northern states are looking for an alternative to expensive fossil fuels. The state and federal governments should provide them with the opportunity to make a cost effective choice that will not compromise the air that they and their community breath. If you or your staff would like discuss options for a national strategy for controlling emissions from OWBs, please contact Louis Fontaine, Compliance Manager for the Bureau of Air Quality at (207) 287-7010 or louis.fontaine@maine.gov. We appreciate your attention to this important matter.

Sincerely,

James P. Brooks, Director
Bureau of Air Quality

Cc: Louis Fontaine, Compliance Manager

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

Prepared By
The Homes and Restaurants Workgroup

Appendix 6: Members of the Homes and Restaurants Workgroup

October 31, 2005

The Homes and Restaurants Workgroup Report
October 31, 2005

Workgroup Name: Homes and Restaurants

Workgroup Leader: Ray Papalski, New Jersey Department of Environmental Protection (NJDEP), Division of Air Quality Planning (DAQ), Bureau of Air Quality Planning (BAQP)

Workgroup Non-State Members:

1. Adeline Arnold, Aberdeen Township Environmental and Shade Tree Advisory Board
2. Stephen Atzert, U.S. Fish and Wildlife Service, E.B. Forsythe National Wildlife Refuge
3. Ana Baptista, Association of New Jersey Environmental Commissions (ANJEC)
4. Laurence Bernson, R&D Council of New Jersey
5. Steve Brown, LCSystems, Inc.
6. Eric DeGesero, Fuel Merchants Association of New Jersey
7. Deborah Dowdell, New Jersey Restaurant Association (NJRA)
8. Kenneth Fradkin, United States Environmental Protection Agency (USEPA) Region 2
9. Jack Goldman, Hearth, Patio & Barbecue Association (HPBA)
10. Anne Leimbach, Mid-Atlantic HPBA
11. Jeff Lynch, White Castle
12. Jeff Miller, White Castle
13. Gabriella Munoz, New York Academy of Sciences
14. Vince Patram, Engelhard Corporation
15. Dawn Prandi, Somerset County Health Department
16. Arnold Schmidt, Union County Health Department
17. Chris Shaffery, White Castle
18. Tim Smith, USEPA, Office of Air Quality Planning and Standards (OAQPS)
19. Paul Truchan, USEPA
20. Rich Vaccaro, Madison-Vector
21. Sandra Valle, New York Academy of Sciences
22. Tina Walling, Aberdeen Township Environmental and Shade Tree Advisory Board
23. Ed Wengryn, New Jersey Farm Bureau
24. John Whitaker, White Castle
25. Chi Wong, White Castle
26. Jerry Woodward, Hearth and Home Technologies

Workgroup State Members:

1. Mohammad Ali, New Jersey Department of Agriculture (NJDOA)
2. Sandra Cohen, Co-Facilitator, NJDEP DAQ BAQP
3. Amy Frank, New Jersey Department of Community Affairs (NJDCA)
4. Ronald Jackson, New Jersey Board of Public Utilities (NJBPU), Office of Clean Energy
5. Kim Johnson, NJBPU, Office of Clean Energy
6. Frank Matula, NJDEP, DAQ, Bureau of Technical Services
7. Deborah Pinto, NJDEP
8. Tom Pitcherello, NJDCA

9. Kety Rosario, NJDEP Division of Compliance and Enforcement (DCE)
10. Jim Scarvalli, NJDEP, DCE, Minor Source Compliance Investigation
11. Laura Scatena, Co-Facilitator, NJDEP DAQ BAQP